PIONEER®
The Art of Entertainment

Service Manual

ORDER NO.
ARP2534

FM/AM DIGITAL SYNTHESIZER TUNER

F-401L HEX1K, HBX1K

F-401 HEWIX1K, SD

F-401L AND F-401 HAVE THE FOLLOWING :

Type	Model		Power Requirement	Remarks
	F-401L	F-401		
HEX1K	○	—	AC220-230V, 240V (switchable)*	
HBX1K	○	—	AC220-230V, 240V (switchable)*	
HEWIX1K	—	○	AC220-230V, 240V (switchable)*	
SD	—	○	AC110V, 120-127V, 220V, 240V (switchable)	

* Change the connection of the power transformer's primary wiring.

● Refer to the service manual ARP2243 for F-449/HEWZ.

- This manual is applicable to the following : F-401L/HEX1K and HBX1K ; F-401/HEWIX1K and SD.
- F-401L covers MW/LW bands while F-401 covers MW.
- Ce manuel pour le service comprend les explications de réglage en français.
- Este manual de servicio trata del método ajuste escrito en español.

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1. CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- *Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

F-401L/HEX1K, HBX1K, F-401/HEWIX1K, SD and F-449/HEWZ have the same construction except for the following :

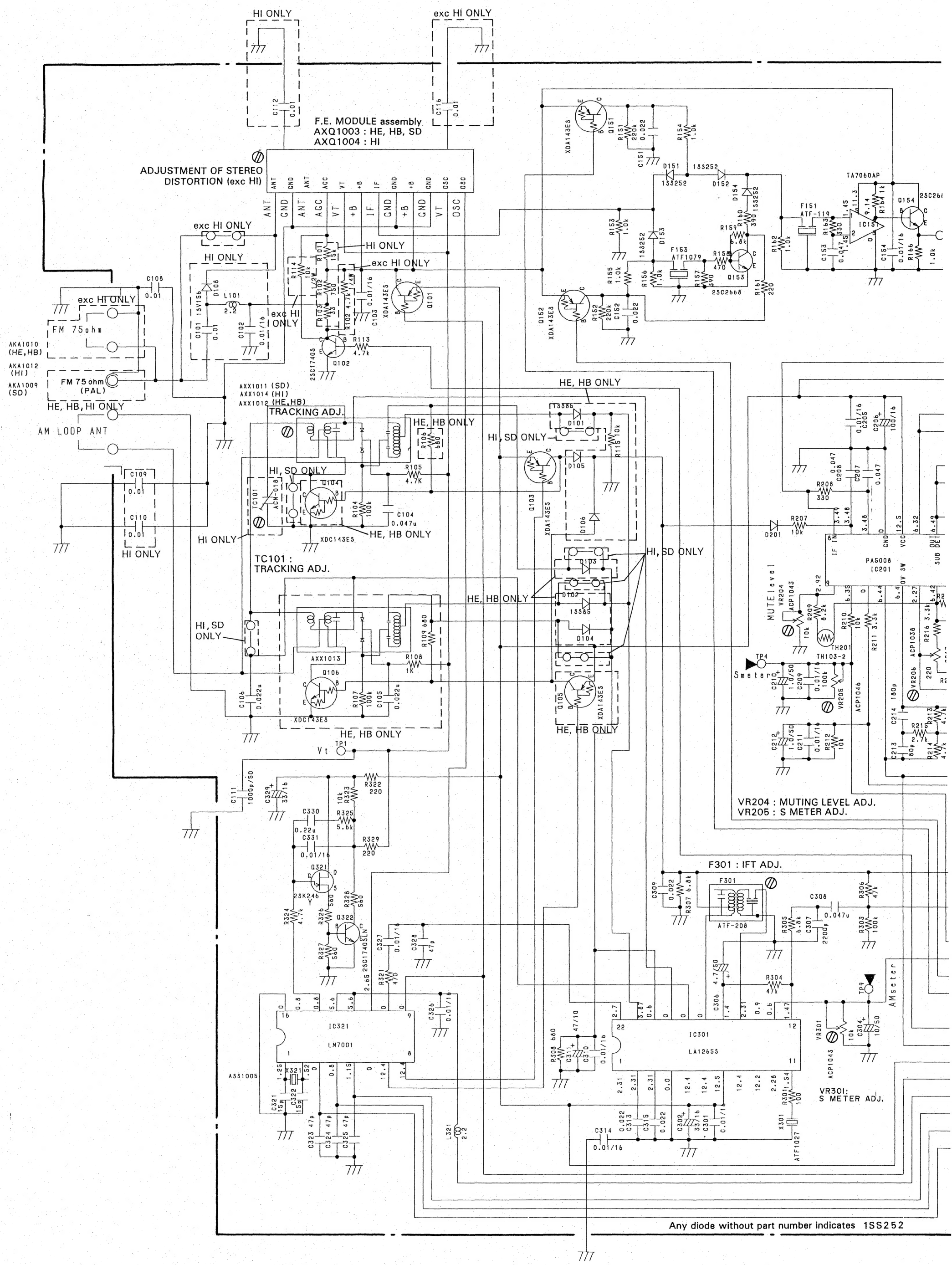
Mark	Symbol & Description	Part No.					Remarks
		F-449/ HEWZ	F-401L/ HEX1K	F-401L/ HBX1K	F-401/ HEWIX1K	F-401/ SD	
◉	TUNER assembly	AWZ3643	AWZ4173	AWZ4173	AWZ4170	AWZ4171	
◉	POWER assembly	AWZ3649	AWZ4177	AWZ4177	AWZ4174	AWZ4175	
◉	DISPLAY assembly	AWP1036	AWP1039	AWP1039	AWP1039	AWP1036	*1
⚠	AC Power cord	ADG1021	ADG1021	ADG1085	ADG1021	ADG1051	
⚠	Strain relief	.....	.....	.....	.....	AEC-882	
	FL filter	AAK1785	AAK1785	AAK1785	AAK1785	AAK1786	
	Screw (EARTH)	ABA1047	.....	.....	ABA1047	.....	
	Screw	.....	.....	.....	.....	PBZ40P080FZK	*2
	Front panel	ANB1451	ANB1515	ANB1515	ANB1514	ANB1514	
	Panel base	AMB1842	AMB1994	AMB1994	AMB1994	AMB1994	
	Bonnet	AZN1745	ANE1140	ANE1140	ANE1140	AZN1745	
NSP	Cushion rubber	.....	AEB1197	AEB1197	AEB1197	AEB1197	
NSP	Binder	.....	.....	AEC-093	.....	.....	
NSP	Rear panel	ANC1695	ANC1714	ANC1714	ANC1909	ANC1694	
	FM antenna assembly	ADH1002	.....	.....	ADH1002	.....	
	FM antenna	.....	ADH1005	ADH1005	.....	ADH1005	
	Front, rear pad	AHA1095	AHA1200	AHA1200	AHA1200	AHA1095	
	Packing case	AHD2056	AHD2259	AHD2259	AHD2289	AHD2258	
	Packing sheet	AHG1017	AHG1107	AHG1107	AHG1107	AHG1017	
	Operating instructions (German)	ARC1264	.....	.....	.....	.....	
	Operating instructions (English, French, German, Dutch, Swedish, Italian, Spanish, Portguese)	.....	ARE1234	.....	.....	.....	
	Operating instructions (Italian)	.....	.....	.....	ARC1358	.....	
	Operating instructions (English)	.....	.....	ARB1365	.....	ARB1365	

*NOTE : *1 Although DISPLAY assembly (AWP1036) and DISPLAY assembly (AWP1039) are different in part number, they have the same service parts.*

**2 For Voltage selector.*

2. SCHEMATIC AND PCB CONNECTIONS DIAGRAMS

2.1 TUNER ASSEMBLY (1/2)



1. RESISTORS:
Indicated in Ω, ¼W, ⅛W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10% (M); ±20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

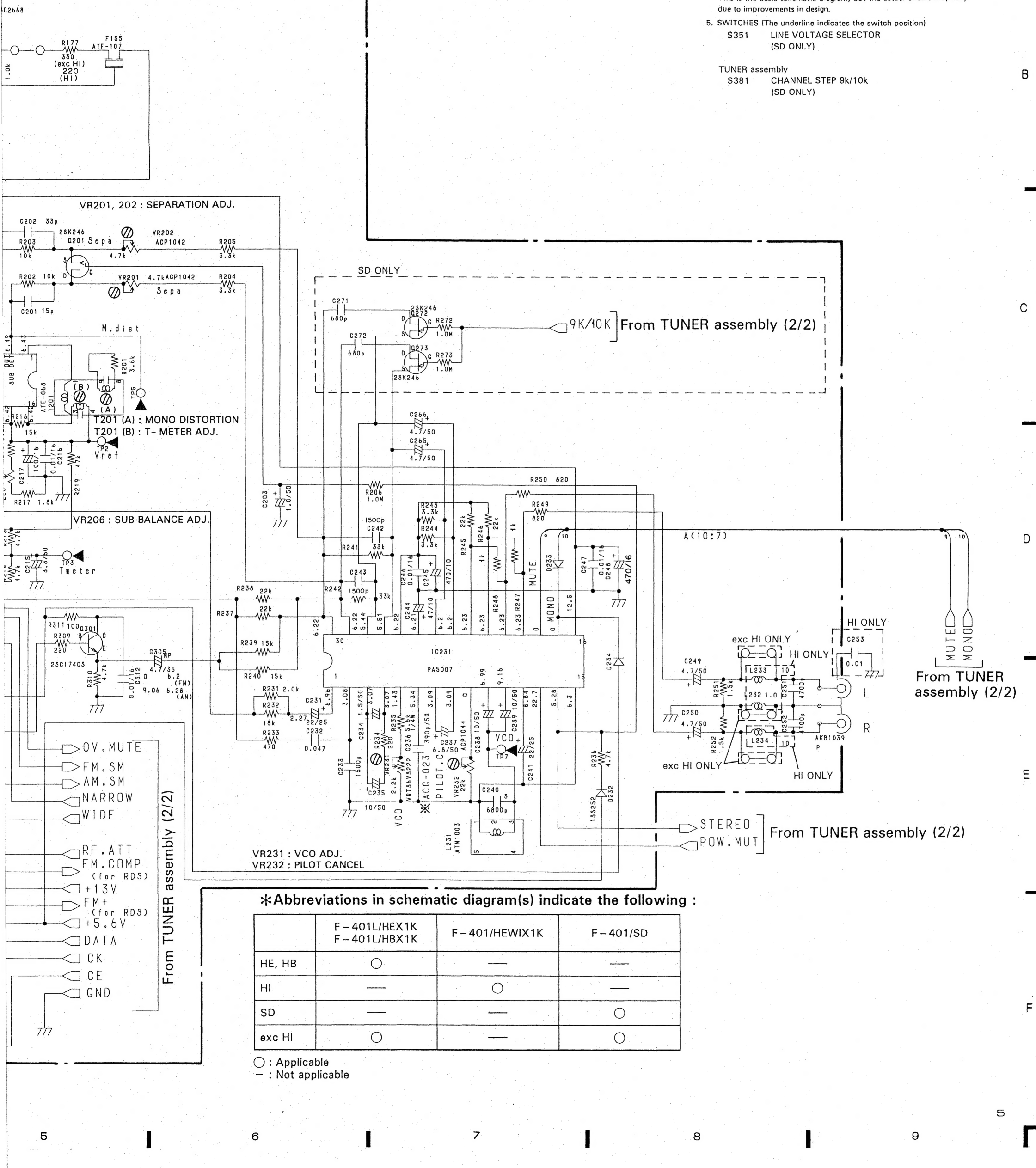
3. VOLTAGE, CURRENT:
: DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power.
⇦ mA : DC current at no input signal
mV : Signal voltage at FM 1kHz ±75kHz DEV.

4. OTHERS:
➡ : Signal route.
⊘ : Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.
▼ (RED) : Measurement point
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5. SWITCHES (The underline indicates the switch position)
S351 LINE VOLTAGE SELECTOR (SD ONLY)

TUNER assembly
S381 CHANNEL STEP 9k/10k (SD ONLY)

TUNER assembly (1/2)(AWZ4173 : HE*, HB*)
(1/2)(AWZ4170 : HI*)
(1/2)(AWZ4171 : SD*)

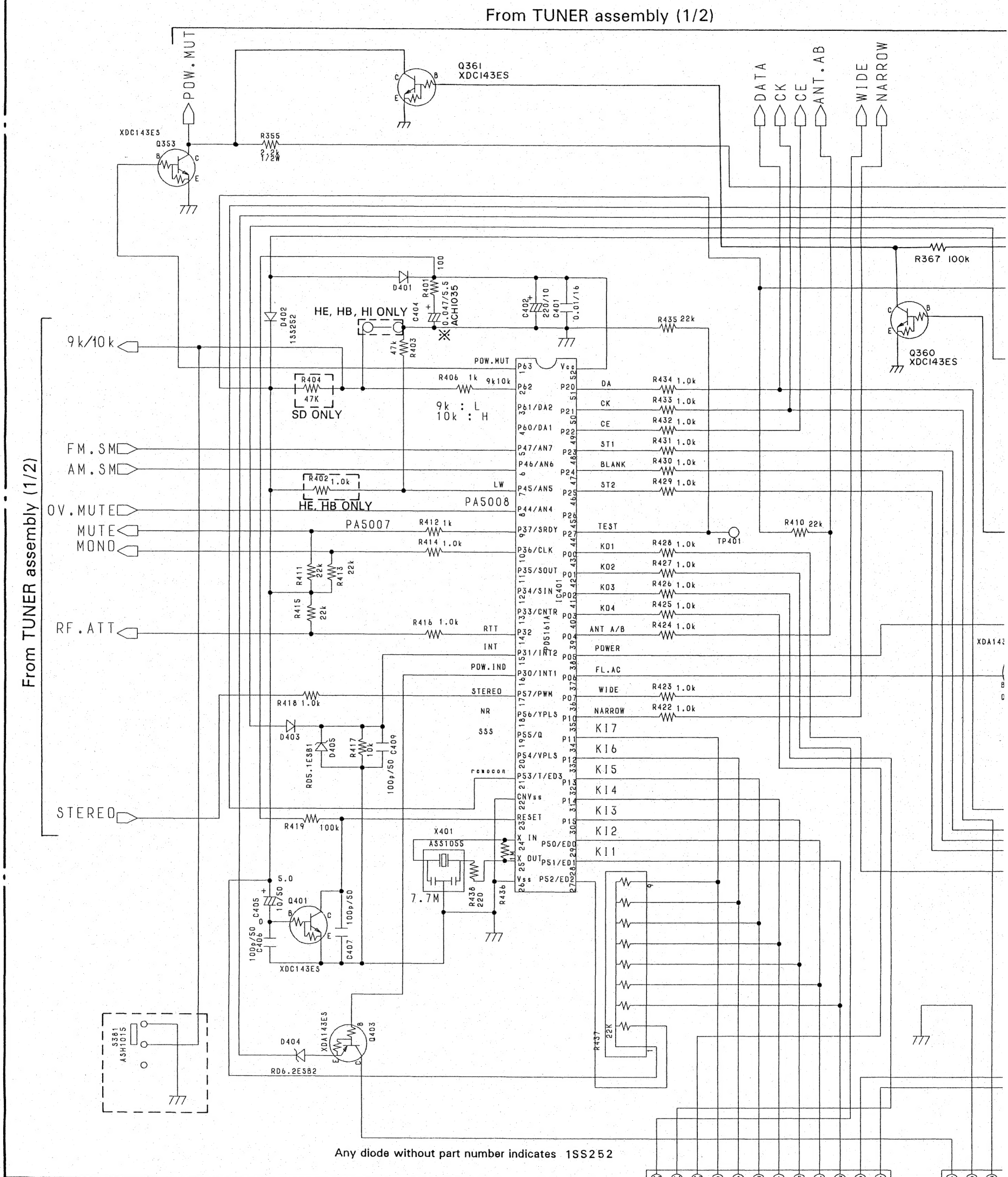


※Abbreviations in schematic diagram(s) indicate the following :

	F-401L/HEX1K F-401L/HBX1K	F-401/HEWIX1K	F-401/SD
HE, HB	○	—	—
HI	—	○	—
SD	—	—	○
exc HI	○	—	○

○ : Applicable
— : Not applicable

2.2 TUNER ASSEMBLY (2/2) AND POWER ASSEMBLY



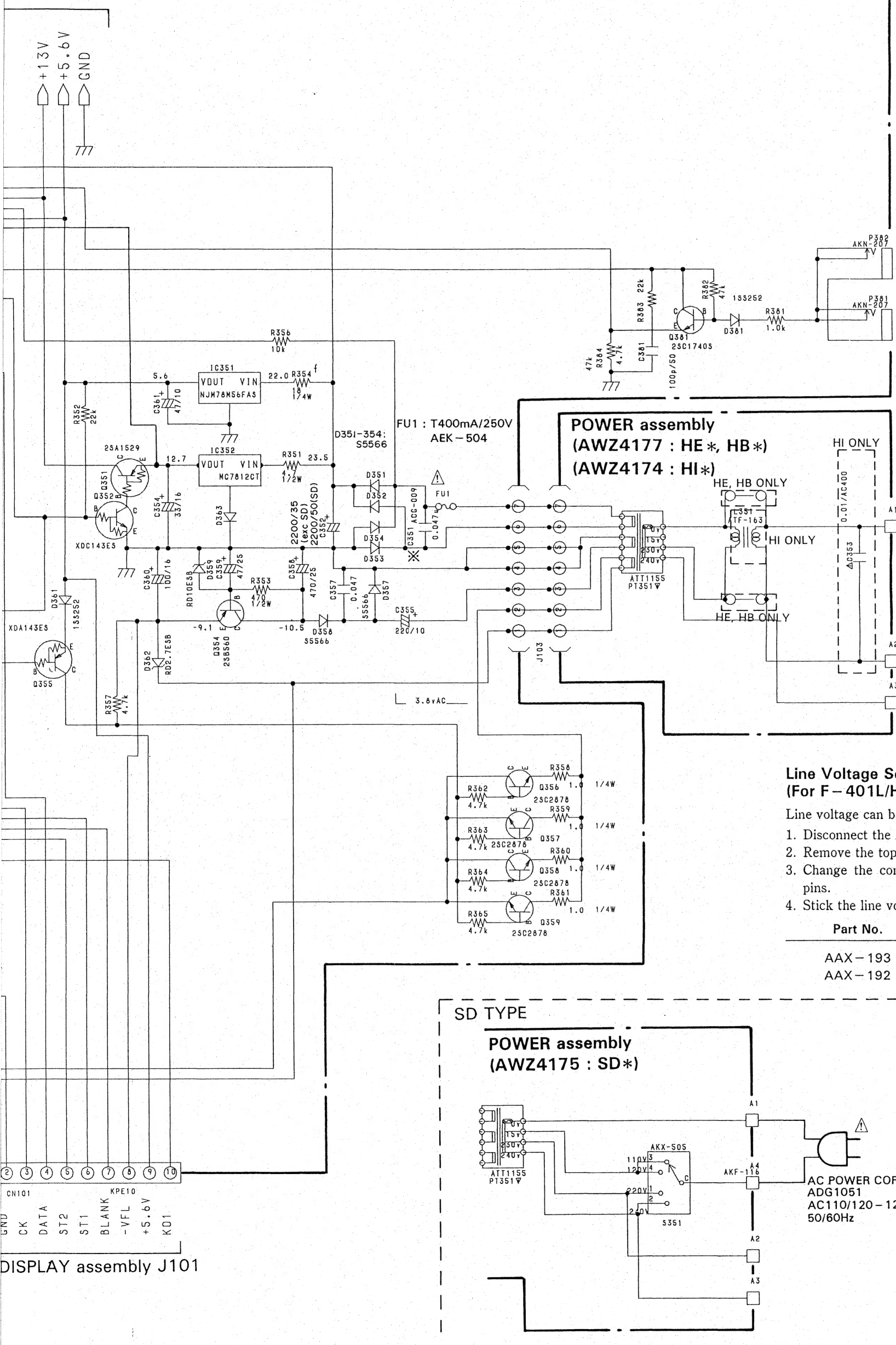
Any diode without part number indicates 1SS252

***Abbreviations in schematic diagram(s) indicate the following :**

	F-401L/HEX1K F-401L/HBX1K	F-401/HEWIX1K	F-401/SD
HE, HB	○	—	—
HI	—	○	—
SD	—	—	○
exc HI	○	—	○

○ : Applicable
— : Not applicable

TUNER assembly (2/2)(AWZ4173 : HE∗, HB∗)
(2/2)(AWZ4170 : HI∗)
(2/2)(AWZ4171 : SD∗)



Line Voltage Selection
(For F-401L/HEX1K, HBX1K and F-401/HEWIX1K)

Line voltage can be changed with the following steps.

1. Disconnect the AC power cord.
2. Remove the top cover.
3. Change the connection of TUNER assembly primary pins.
4. Stick the line voltage label on the rear panel.

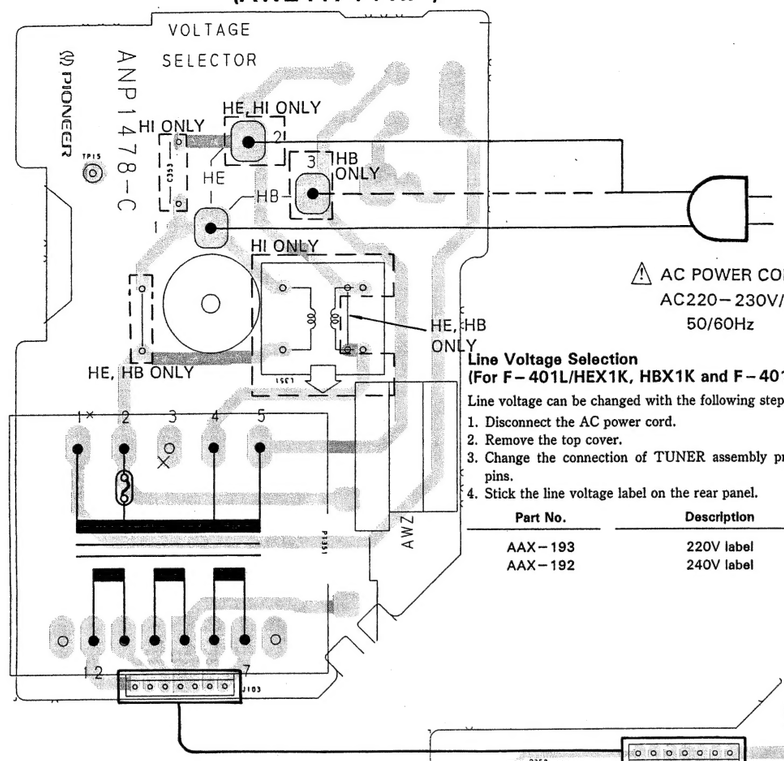
Part No.	Description
AAX-193	220V label
AAX-192	240V label

SD TYPE

2.3 PCB PATTRENS

This P. C. B connection diagram is viewed from the parts mounted side.

POWER assembly (AWZ4177 : HE*, HB*)
(AWZ4174 : HI*)



⚠ AC POWER CORD
AC220–230V/240V
50/60Hz

Line Voltage Selection
(For F–401L/HEX1K, HBX1K and F–401/HEWIX1K)

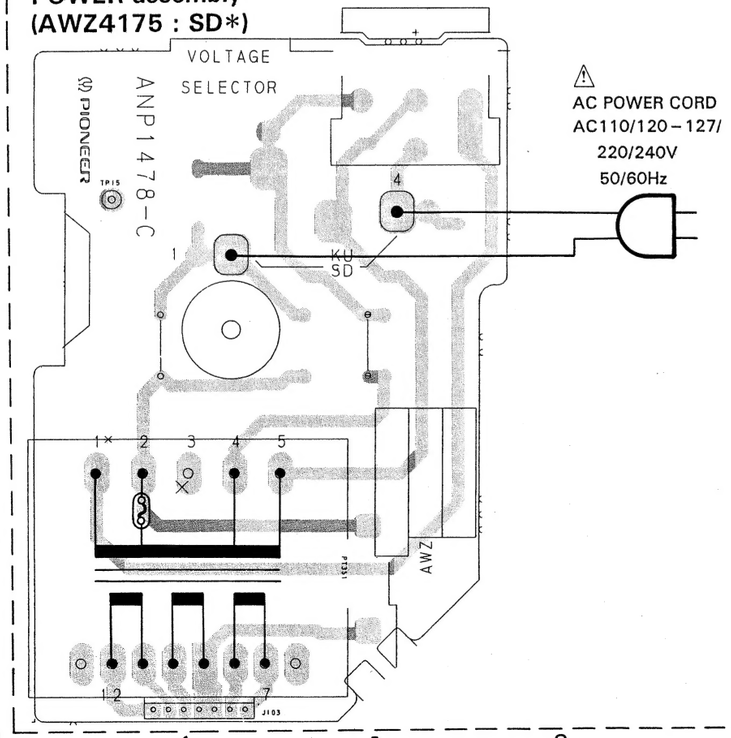
Line voltage can be changed with the following steps.

1. Disconnect the AC power cord.
2. Remove the top cover.
3. Change the connection of TUNER assembly primary pins.
4. Stick the line voltage label on the rear panel.

Part No.	Description
AAX–193	220V label
AAX–192	240V label

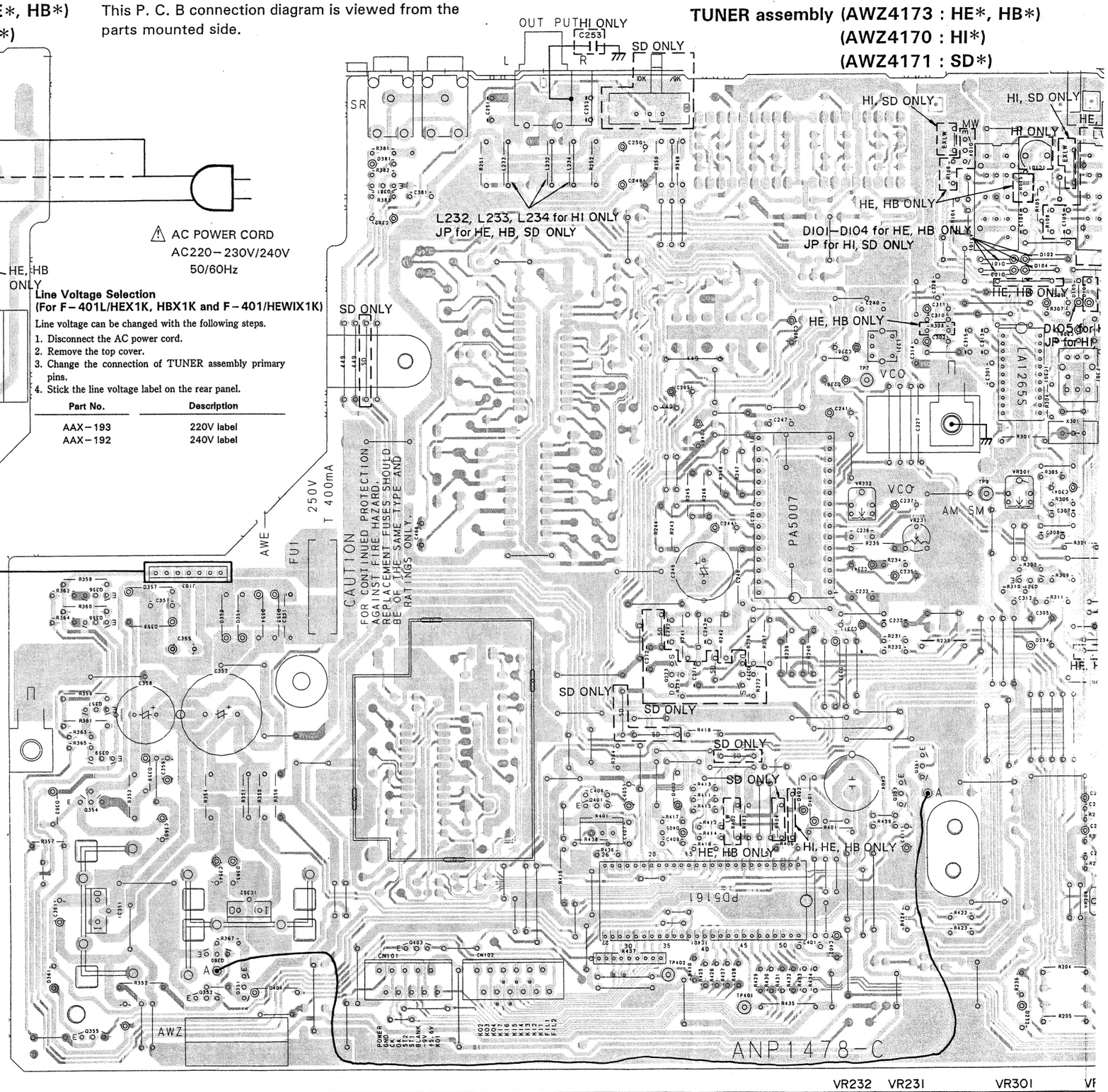
SD* ONLY

POWER assembly
(AWZ4175 : SD*)



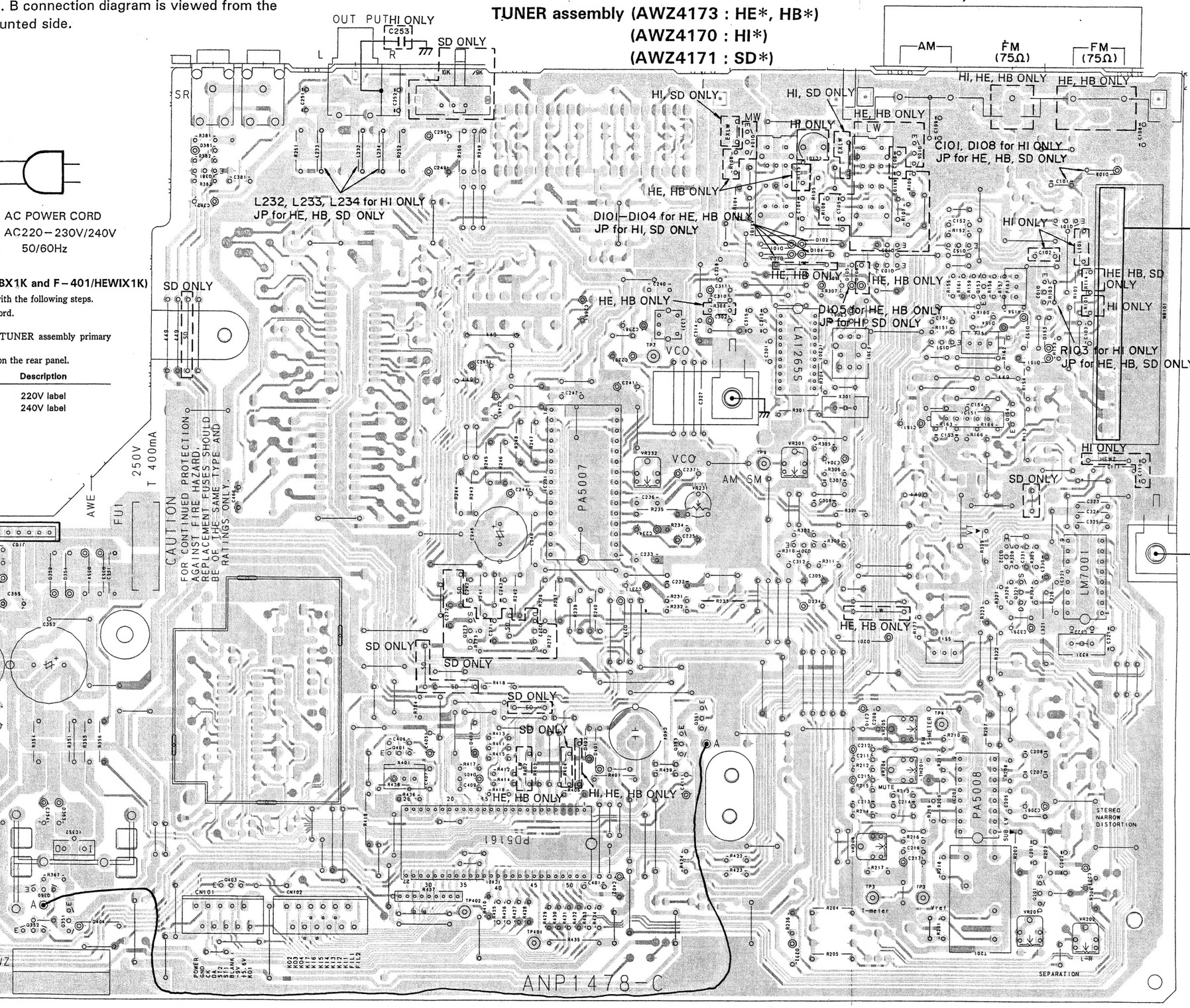
⚠ AC POWER CORD
AC110/120–127/
220/240V
50/60Hz

TUNER assembly (AWZ4173 : HE*, HB*)
(AWZ4170 : HI*)
(AWZ4171 : SD*)



. B connection diagram is viewed from the
unted side.

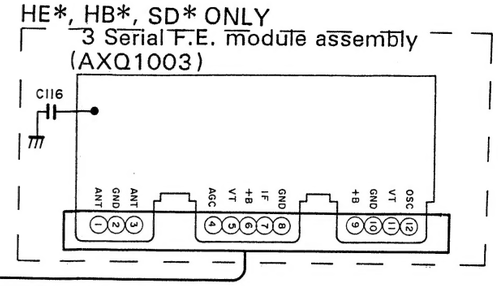
TUNER assembly (AWZ4173 : HE*, HB*)
(AWZ4170 : HI*)
(AWZ4171 : SD*)



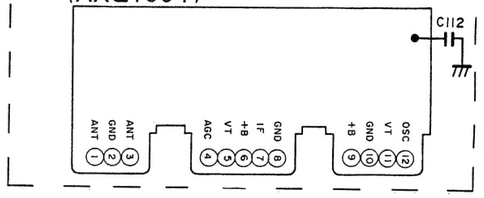
BX1K and F–401/HEWIX1K)
ith the following steps.
ord.
TUNER assembly primary
n the rear panel.

Description
220V label
240V label

HE*, HB*, SD* ONLY
3 Serial F.E. module assembly
(AXQ1003)



HI* ONLY
4 Serial F.E. module assembly
(AXQ1004)



*** Abbreviations in PCB diagram(s) indicate the following :**

	F–401L/HEX1K F–401L/HBX1K	F–401/HEWIX1K	F–401/SD
HE, HB	○	—	—
HI	—	○	—
SD	—	—	○

○ : Applicable
— : Not applicable

NOTE

1. This P.C.B connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the following Table.

P.C.B. pattern diagram indication	Corresponding part symbol	Part Name
Q504		Transistor
Q215		Radiator type transistor
D203	D203	Diode
R237	R237	Resistor
C513		Capacitor (Polarized)
C518		Capacitor (Non-polarized)

Others

P.C.B. pattern diagram indication	Part Name
IC	IC
S	Switch
RY	Relay
L	Coil
F	Filter
VR	Variable resistor or Semi-fixed resistor

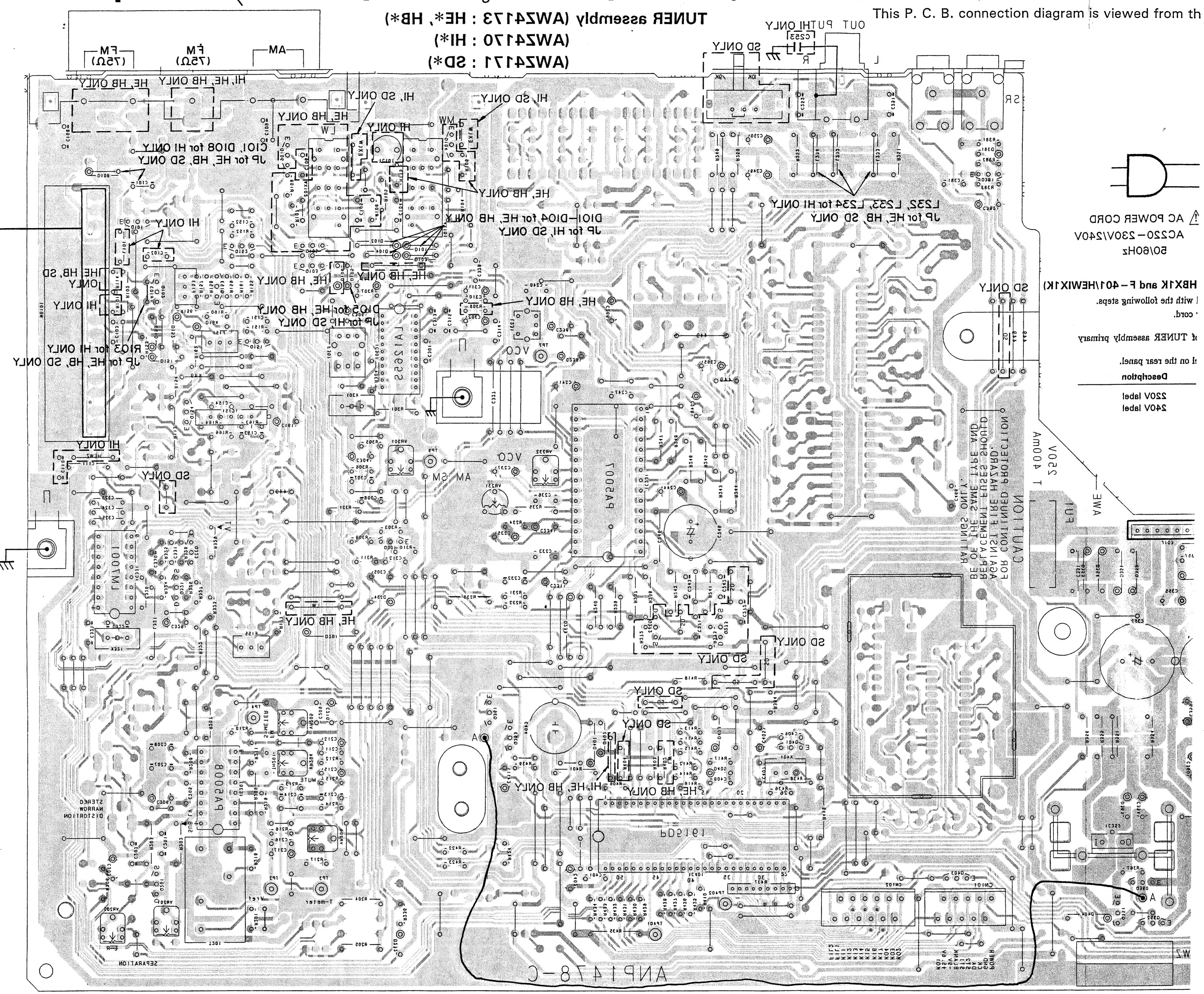
3. The capactor terminal marked with ⊖(double circles) shows negative terminal.
4. The diode terminal marked with ⊖(double circles) shows cathode side.
5. The transistor terminal to which E is affixed shows the emitter.

This P. C. B. connection diagram is viewed from th

TUNER assembly (AWZ4173 : HE*, HB*)
(AWZ4170 : HI*)
(AWZ4171 : SD*)

HE*, HB*, SD* ONLY
3 Serial F.E. module assembly
(AXO1003)

HI* ONLY
4 Serial F.E. module assembly
(AXO1004)



AC POWER CORD
AC220–230V/240V
50/60Hz

* Abbreviations in PCB diagram(s) indicate the following :

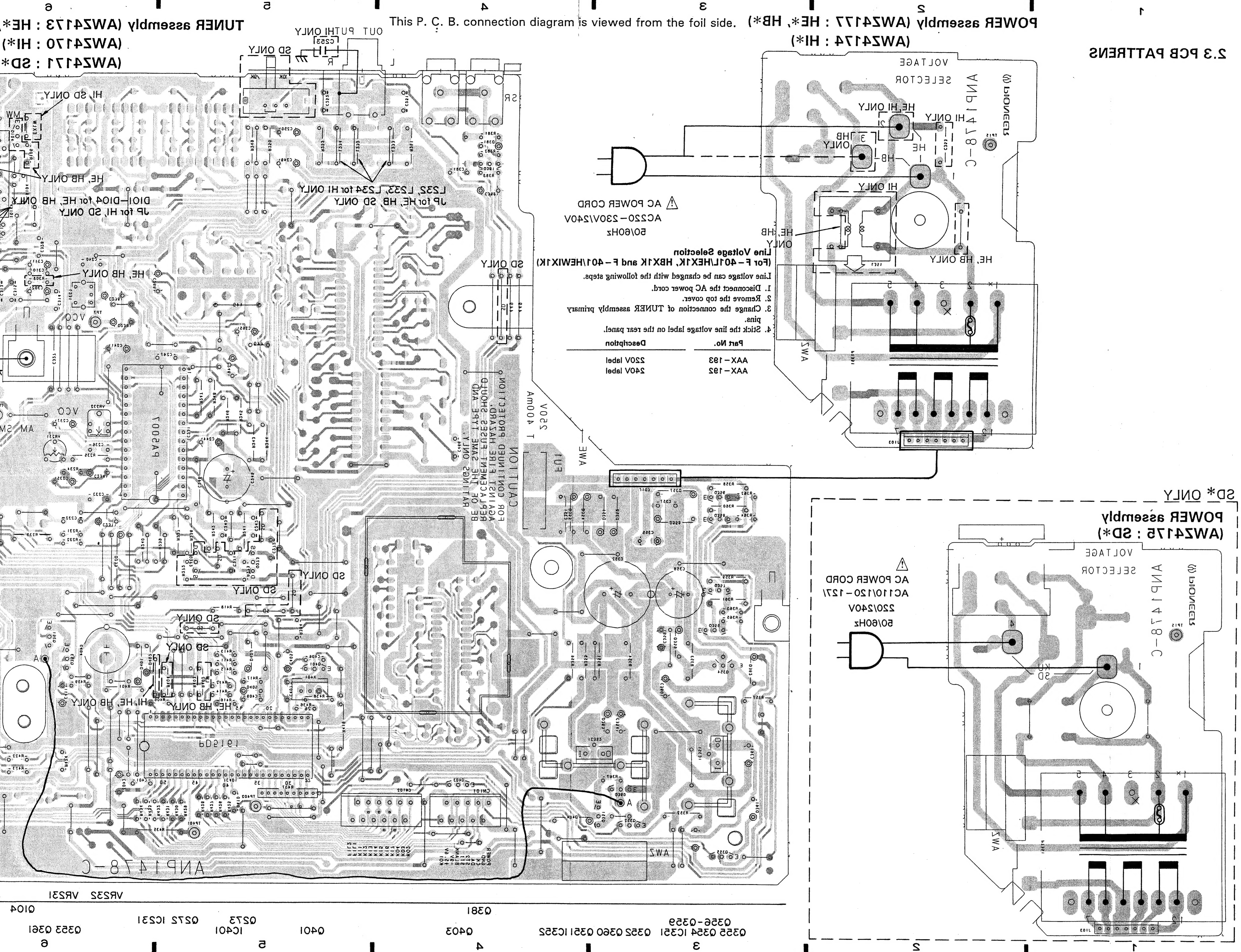
	F-401L/HEX1K F-401L/HBX1K	F-401/HEWIX1K	F-401/SD
HE, HB	○	—	—
HI	—	○	—
SD	—	—	○

○ : Applicable
— : Not applicable

VR202 VR201 VR204–VR206 VR301 VR231 VR232
Q102 Q101 Q151–Q154 Q103 Q105 Q106 IC301 Q104 Q273 Q381
IC321 IC322 Q322 Q321 IC151 Q301 Q272 IC231
Q201 IC201 Q361 Q353 IC401 Q401 Q403 Q352 Q360 Q351 IC352

2.3 PCB PATTERNS

This P. C. B. connection diagram is viewed from the foil side.



3. PCB PARTS LIST

3.1 FOR F-401L/HEX1K AND HBX1K

NOTES:

- *Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*
- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω → 56 × 10¹ → 561 ..... RD1/8PM 5 6 1 J
47kΩ → 47 × 10³ → 473 ..... RD1/4PS 4 7 3 J
0.5Ω → 0R5 ..... RN2H 0 R 5 K
1Ω → 010 ..... RS1P 0 1 0 K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ → 562 × 10¹ → 5621 ..... RN1/4PC 5 6 2 1 F

Mark	No.	Description	Parts No.
LIST OF ASSEMBLIES			
◉		TUNER ASSEMBLY	AWZ4173
◉		POWER ASSEMBLY	AWZ4177
◉		DISPLAY ASSEMBLY	AWP1039
TUNER ASSEMBLY			
SEMICONDUCTORS			
	IC151	AMPLIFIER IC	TA7060AP
	IC201	FM IC	PA5008
	IC231	MPX IC	PA5007
	IC301	AM/FM IC	LA1265S
	IC321	PLL IC	LM7001
	IC351	REGULATOR IC	NJM78M56FAS
	IC352	REGULATOR IC	MC7812CT
	IC401	TUNER CONTROL MICRO-COMPUTER	PD5161A
	Q101	TRANSISTOR	XDA143ES
	Q102	TRANSISTOR	2SC1740S
	Q103	TRANSISTOR	XDA143ES
	Q104	TRANSISTOR	XDC143ES
	Q105	TRANSISTOR	XDA143ES
	Q106	TRANSISTOR	XDC143ES
	Q151, 152	TRANSISTOR	XDA143ES
	Q153, 154	TRANSISTOR	2SC2668
	Q201	N-FET	2SK246
	Q301	TRANSISTOR	2SC1740S
	Q321	N-FET	2SK246
	Q322	TRANSISTOR	2SC1740SLN
	Q351	TRANSISTOR	2SA1529
	Q352, 353	TRANSISTOR	XDC143ES
	Q354	TRANSISTOR	2SB560
	Q355	TRANSISTOR	XDA143ES
	Q356-359	TRANSISTOR	2SC2878
	Q360	TRANSISTOR	XDC124ES
	Q361	TRANSISTOR	XDC124ES
	Q381	TRANSISTOR	2SC1740S
	Q401	TRANSISTOR	XDC143ES
	Q403	TRANSISTOR	XDA143ES
	D101, 102	DIODE	1SS85
	D103-106	DIODE	1SS252
	D151-154	DIODE	1SS252
	D201	DIODE	1SS252
	D232-234	DIODE	1SS252
⚠	D351-354	DIODE	S5566
⚠	D357, 358	DIODE	S5566
	D359	ZENER DIODE	RD10ESB
	D361	DIODE	1SS252
	D362	ZENER DIODE	RD2.7ESB
	D363, 381	DIODE	1SS252
	D401-403	DIODE	1SS252
	D404	ZENER DIODE	RD6.2ESB2
	D405	ZENER DIODE	RD5.1ESB1
COILS & TRANSFORMER			
	F151	CERAMIC FILTER	ATF-119
	F153	CERAMIC FILTER	ATF1079
	F155	CERAMIC FILTER	ATF-107
	F301	CERAMIC FILTER	ATF-208
	L231	COIL	ATM1003
	L321	AXIAL INDUCTOR	LAU2R2M
	T201	IF TRANSFORMER	ATE-068
CAPACITORS			
	C103	CERAMIC CAPACITOR	CKPUYY103M16
	C104	CERAMIC CAPACITOR	CKDYF473Z50
	C105, 106	CERAMIC CAPACITOR	CKDYF223Z50
	C108, 109	CERAMIC CAPACITOR	CKDYX103M25
	C111	CERAMIC CAPACITOR	CKPUYB102K50

Mark	No.	Description	Parts No.
	C116	CERAMIC CAPACITOR	CKDYX103M25
	C151, 152	CERAMIC CAPACITOR	CKDYF223Z50
	C153	CERAMIC CAPACITOR	CKDYX473M25
	C154	CERAMIC CAPACITOR	CKPUYY103M16
	C201	CERAMIC CAPACITOR	CCMCH150J50
	C202	CERAMIC CAPACITOR	CCMCH330J50
	C203	ELECT. CAPACITOR	CEAS010M50
	C205	CERAMIC CAPACITOR	CKPUYY103M16
	C206	ELECT. CAPACITOR	CEAS101M25
	C207, 208	CERAMIC CAPACITOR	CKDYX473M25
	C209	CERAMIC CAPACITOR	CKPUYY103M16
	C210	ELECT. CAPACITOR	CEAS010M50
	C211	CERAMIC CAPACITOR	CKPUYY103M16
	C212	ELECT. CAPACITOR	CEAS010M50
	C213, 214	CERAMIC CAPACITOR	CKMYB181K50
	C215	ELECT. CAPACITOR	CEAS4R7M50
	C216	CERAMIC CAPACITOR	CKPUYY103M16
	C217	ELECT. CAPACITOR	CEAS101M25
	C231	ELECT. CAPACITOR	CEAS220M50
	C232	AUDIO FILM CAPACITOR	CFTXA473J50
	C233	CERAMIC CAPACITOR	CKCYB152K50
	C234	ELECT. CAPACITOR	CEAS1R5M50
	C235	ELECT. CAPACITOR	CEAS100M50
	C236	CKA (390P/50V)	ACG−023
	C237	ELECT. CAPACITOR	CEAS6R8M50
	C238, 239	ELECT. CAPACITOR	CEAS100M50
	C240	PL.STYRENE CAPACITOR	CQSA682J50
	C241	ELECT. CAPACITOR	CEAS220M50
	C242, 243	MYLAR FILM CAPACITOR	CQMA152J50
	C244	ELECT. CAPACITOR	CEAS470M25
	C245	ELECT. CAPACITOR	CEAS471M10
	C246, 247	CERAMIC CAPACITOR	CKPUYY103M16
	C248	ELECT. CAPACITOR	CEAS471M16
	C249, 250	ELECT. CAPACITOR	CEAS4R7M50
	C251, 252	CERAMIC CAPACITOR	CKDYB472K50
	C265, 266	ELECT. CAPACITOR	CEAS4R7M50
	C301	CERAMIC CAPACITOR	CKPUYY103M16
	C302	ELECT. CAPACITOR	CEAS330M35
	C304	ELECT. CAPACITOR	CEAS100M50
	C305	ELECT. CAPACITOR	CEANP4R7M50
	C306	ELECT. CAPACITOR	CEAS4R7M50
	C307	CERAMIC CAPACITOR	CKCYB222K50
	C308	CERAMIC CAPACITOR	CKDYX473M25
	C309	CERAMIC CAPACITOR	CKDYF223Z50
	C310	CERAMIC CAPACITOR	CKPUYY103M16
	C311	ELECT. CAPACITOR	CEAS470M25
	C312	CERAMIC CAPACITOR	CKPUYY103M16
	C313	CERAMIC CAPACITOR	CKDYF223Z50
	C314	CERAMIC CAPACITOR	CKPUYY103M16
	C315	CERAMIC CAPACITOR	CKDYF223Z50
	C321, 322	CERAMIC CAPACITOR	CCMCH150J50
	C323−325	AXIAL CAPACITOR	CCPUSL470J50
	C326, 327	CERAMIC CAPACITOR	CKPUYY103M16
	C328	AXIAL CAPACITOR	CCPUSL470J50
	C329	ELECT. CAPACITOR	CEAS330M35
	C330	AUDIO FILM CAPACITOR	CFTXA224J50
	C331	CERAMIC CAPACITOR	CKPUYY103M16
⚠	C351	CAPACITOR (CERAMIC)	ACG−009
	C352	ELECT. CAPACITOR	CEAS222M35
	C354	ELECT. CAPACITOR	CEAS330M35
	C355	ELECT. CAPACITOR	CEAS221M10
	C357	CERAMIC CAPACITOR	CKDYF473Z50
	C358	ELECT. CAPACITOR	CEAS471M25
	C359	ELECT. CAPACITOR	CEAS470M25
	C360	ELECT. CAPACITOR	CEAS101M25
	C361	ELECT. CAPACITOR	CEAS470M25
	C381	CERAMIC CAPACITOR	CKPUYB101K50
	C401	CERAMIC CAPACITOR	CKPUYY103M16
	C402	ELECT. CAPACITOR	CEAS221M10
	C404	CAPACITOR	ACH1135
	C405	ELECT. CAPACITOR	CEAS100M50
	C406, 407	CERAMIC CAPACITOR	CKPUYB101K50
	C409	CERAMIC CAPACITOR	CKPUYB101K50
RESISTORS			
	VR201, 202	VR (4.7kΩ)	ACP1042
	VR204	VR (10kΩ)	ACP1043
	VR205	VR (100kΩ)	ACP1046
	VR206	VR (220Ω)	ACP1038
	VR231	VR	VRTS6VS222
	VR232	VR (22kΩ)	ACP1044
	VR301	VR (10kΩ)	ACP1043
	R102	CARBON FILM RESISTOR	RD1/4PM472J
	R235	METALFILM RESISTER	RN1/4PC5601F
	R237, 238	CARBON FILM RESISTOR	RDR1/4PM223J
	R241, 242	CARBON FILM RESISTOR	RDR1/4PM333J
	R243, 244	CARBON FILM RESISTOR	RDR1/4PM332J
	R245, 246	CARBON FILM RESISTOR	RDR1/4PM223J
	R247, 248	CARBON FILM RESISTOR	RDR1/4PM102J
	R249, 250	CARBON FILM RESISTOR	RDR1/4PM821J
	R251, 252	CARBON FILM RESISTOR	RDR1/4PM152J
	R351	CARBON FILM RESISTOR	RD1/2PM4R7J
	R353	CARBON FILM RESISTOR	RD1/2PM471J
⚠	R354	FUSLIBLE RESISTOR	RFA1/4PS180J
	R355	CARBON FILM RESISTOR	RD1/2PM222J

Mark	No.	Description	Parts No.
	R358–361	CARBON FILM RESISTOR	RD1/4PM010J
	R437	RESISTOR ARRAY (22K)	RA8T223J
		Other resistors	RD1/8PM□□□J

OTHERS

TH201	THERMISTOR	TH103–2
CN101	CONNECTOR (10P)	KPE10
CN102	CONNECTOR (12P)	KPE12
X301	CERAMIC RESONATOR (450kHz)	ATF1027
X321	CRYSTAL RESONATOR (7.2MHz)	ASS1005
X401	CERAMIC RESONATOR (7.7MHz)	ASS1055
	SCREW	ABA–298
	ANTENNA TERMINAL 4–P WITH PAL	AKA1010
	PIN JACK 2P	AKB1039
	JACK	AKN–207
	AM RF TUNING BLOCK	AXX1012
	AM RF TUNING BLOCK	AXX1013
	3 SERIAL F.E. MODULE ASSEMBLY	AXQ1003

NOTE :

3. Serial F.E. module assembly has no service parts.

POWER ASSEMBLY

TRANSFORMER

Mark	No.	Description	Parts No.
⚠	T351	POWER TRANSFORMER	ATT1155

DISPLAY ASSEMBLY

Although DISPLAY assembly (AWP1036) and DISPLAY assembly (AWP1039) are different in part number, they have the same service parts.

3.2 FOR F-401/HEWIX1K AND SD

NOTES:

- *Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

TUNER ASSEMBLY

TUNER assembly (AWZ4170, AWZ4171) and TUNER assembly (AWZ4173) have the same construction except for the following :

Mark	Symbol & Description	Part No.			Remarks
		AWZ4173	AWZ4170	AWZ4171	
	Q104, Q106	XDC143ES	.....	.....	
	Q105	XDA143ES	.....	.....	
	Q272, Q273	.....	.....	2SK246	
	D101, D102	1SS85	.....	.....	
	D103–D106	1SS252	.....	.....	
	D108	.....	1SV156	.....	
	S381 9k/10k selector	.....	.....	ASH1015	
	L101	.....	LAU2R2M	.....	
	L232	.....	LAU010M	.....	
	L233, L234	.....	LAU100K	.....	
	TC101	.....	ACM-018	.....	
	C101, C110, C112, C253	.....	CKDYX103M25	.....	
	C102	.....	CKPUYY103M16	.....	
	C105	CKDYF223Z50	.....	.....	
	C116	CKDYX103M25	.....	CKDYX103M25	
	C271, C272	.....	.....	CKCYB681K50	
	C352	CEAS222M35	CEAS222M35	CEAS222M50	
	R101	.....	RD1/8PM153J	.....	
	R102	RD1/4PM472J	RD1/2PM751J	RD1/4PM472J	
	R103	.....	RD1/8PM330J	.....	
	R106, R109, 308	RD1/8PM681J	.....	.....	
	R107	RD1/8PM104J	.....	.....	
	R108, R402	RD1/8PM102J	.....	.....	
	R114	RD1/8PM103J	.....	RD1/8PM103J	
	R115	RD1/8PM103J	.....	.....	
	R177	RD1/8PM331J	RD1/8PM221J	RD1/8PM331J	
	R272, R273	.....	.....	RD1/8PM105J	
	R404	.....	.....	RD1/8PM473J	
	Antenna terminal 4P	.....	.....	AKA1009	
	Antenna terminal 4P with PAL	AKA1010	.....	.....	
	Antenna terminal 2P with PAL	.....	AKA1012	.....	

Mark	Symbol & Description	Part No.			Remarks
		AWZ4173	AWZ4170	AWZ4171	
	3 Serial F.E. module assembly	AXQ1003	.....	AXQ1003	*1
	4 Serial F.E. module assembly	.....	AXQ1004	.....	*1
	AM RF Tuning block	AXX1012	AXX1014	AXX1011	
	AM RF Tuning block	AXX1013	.....	.....	

**1 All of these assemblies has no service parts.*

POWER ASSEMBLY

POWER assembly (AWZ4174, AWZ4175) and POWER assembly (AWZ4177) have the same construction except for the following :

Mark	Symbol & Description	Part No.			Remarks
		AWZ4177	AWZ4174	AWZ4175	
⚠	S351 Voltage selector (AC110V/120-127V/220V/240V)	.....	.....	AKX-505	
⚠	L351	.....	ATF-163	.....	
⚠	C353	.....	ACG1002	.....	

4. ADJUSTMENTS

4.1 FM TUNER ADJUSTMENTS

● Connect as shown in the Fig. 4−1.

4.1.1 FM MONO

Step	Adjustment name	FM SG (1kHz±75kHz dev.)			FL display IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	T-meter adjustment	98MHz	MONO	60dBμV	98MHz NORMAL	T201-B	Adjust so that the voltage between TP2 and TP3 becomes 0±100mV.
2	MONO distortion adjustment	98MHz	MONO	60dBμV	98MHz NORMAL	T201-A	Adjust so that the distortion becomes minimum.
3	Sub-balance adjustment	98MHz	MONO	60dBμV	98MHz NORMAL	VR206	Adjust so that the AC voltage at IC201 pin2 (TP5) becomes minimum.

4.1.2 FM STEREO

Stereo modulation : Main 1kHz L+R ±68.25kHz, Pilot 19kHz±6.75kHz

Step	Adjustment name	FM SG (1kHz±75kHz dev.)			FL display IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	VCO adjustment	108MHz	OFF	60dBμV	108MHz	VR231	Adjust so that the output at TP7 becomes 38kHz ±100Hz.
2	Pilot cancel	107MHz	PILOT ONLY	60dBμV	107MHz NORMAL	VR232	Adjust so that the AC voltage at output terminal becomes minimum. (MAX LPF : OFF)
3	Separation adjustment	89MHz	R-ONLY	60dBμV	89MHz NORMAL	VR202	Adjust so that the separation R → L becomes maximum.
4			L-ONLY	60dBμV	89MHz NORMAL	VR201	Adjust so that the separation L → R becomes maximum.
5	Stereo distortion adjustment *1	89MHz	L-ONLY	60dBμV	89MHz	Front End IFT T101	Minimize the distortion within 1/4 ratation of the core, and check conformity to the specification.

**1 : F−401L/HEX1K, HBX1K and F−401/SD only*

4.1.3 FM ETC

Step	Adjustment name	FM SG (1kHz±75kHz dev.)			FL display IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	S-meter adjustment	99MHz	MONO	75dBμV	99MHz NORMAL	VR205	Adjust so that the voltage between TP4 and GND becomes 4.9V $^{+0.05}_{-0.1}$ V.
2	Muting level adjustment	99MHz	MONO	12dBμV	99MHz NORMAL	VR204	Adjust so that the muting is released at the input level shown on the left..

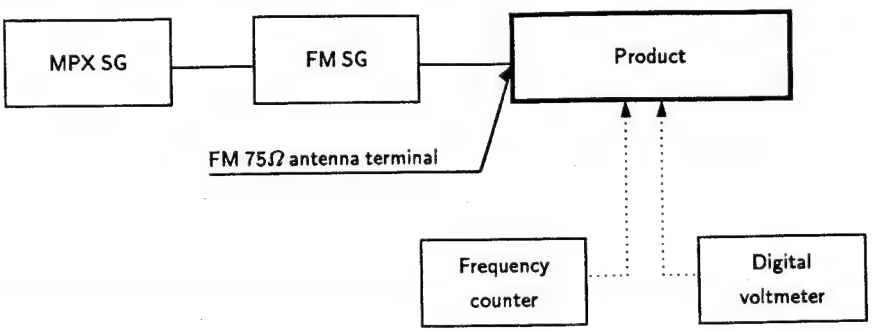


Fig. 4−1 FM Adjustment Connection Diagram

4.2 AM TUNER ADJUSTMENTS

● Connect as shown in the Fig. 4−2.

Step	Adjustment name	AM SG (400Hz 30% modulation)			FL display IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	Tracking adjustment *1	603kHz	OFF	Low input level	603kHz	ANT. coil of MW block (AXX1014)	Adjust so that the voltage between TP9 and GND becomes maximum.
		1395kHz	OFF	Low input level	1395kHz	TC101	
2	IFT adjustment *1	603kHz	OFF	Low input level	603kHz	F301	
3	S-meter adjustment	1008kHz	ON	74dBμV/m	1008kHz	VR301	Adjust so that the voltage between TP9 and GND becomes 2.5 ±0.05V.

**1 : For F−401/HEWIX1K only*

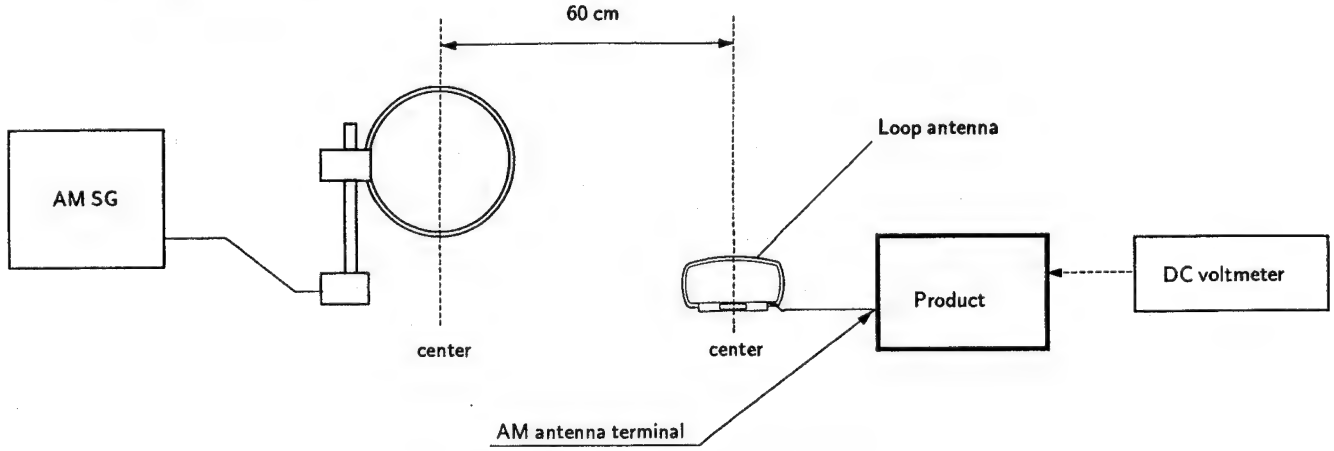


Fig. 4−2 MW Adjustment Connection Diagram

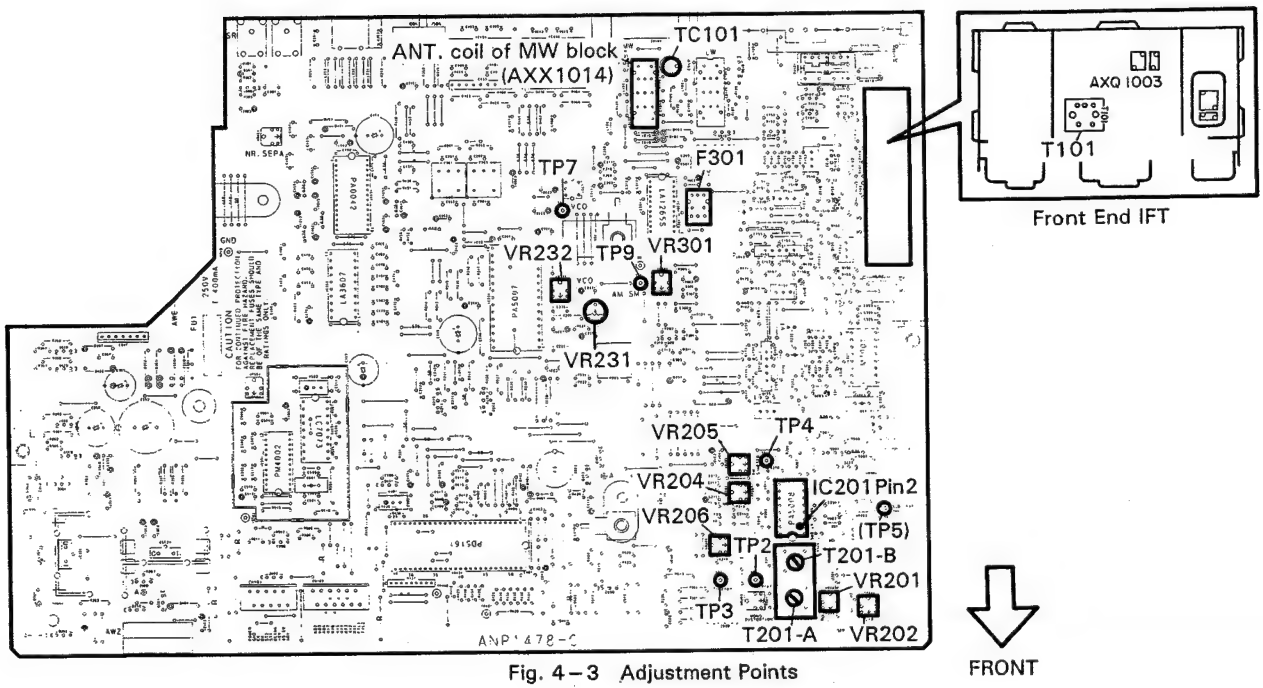


Fig. 4−3 Adjustment Points

4. REGLAGES

4.1 REGLAGES DU SYNTONISEUR FM

● Raccorder comme indiqué à la Fig. 4−1.

4.1.1 MONO FM

Etape	Nom du réglage	FM SG (1kHz±75kHz dev.)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Appareil de mesure en T	98MHz	MONO	60dBμV	98MHz NORMAL	T201-B	Régler afin que la tension entre TP2 et TP3 soit de 0±100mV.
2	Réglage de distorsion MONO	98MHz	MONO	60dBμV	98MHz NORMAL	T201-A	Régler afin que la distorsion soit minimale.
3	Réglage de l'équilibre auxiliaire	98MHz	MONO	60dBμV	98MHz NORMAL	VR206	Régler afin que la tension CA à IC201 Broche 2 (TP5) soit minimale.

4.1.2 STEREO FM

Modulation de Stéréo : Principalé 1kHz L+R ±68,25kHz. Pilote 19kHz±6,75kHz

Etape	Nom du réglage	FM SG (1kHz±75kHz dev.)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Réglage du VCO	108MHz	OFF	60dBμV	108MHz	VR231	Régler afin que la sortie à TP7 soit de 38kHz ±100Hz.
2	Neutralisation pilote	107MHz	PILOT ONLY	60dBμV	107MHz NORMAL	VR232	Régler afin que la tension CA, bornes de sortie, soit minimale. (MAX LPF : HORS CIRCUIT)
3	Réglage du séparation	89MHz	R-ONLY	60dBμV	89MHz NORMAL	VR202	Régler afin que la séparation D → G soit maximale.
4			L-ONLY	60dBμV	89MHz NORMAL	VR201	Régler afin que la séparation D → G soit maximale.
5	Réglage de distorsion stéréo *1	89MHz	L-ONLY	60dBμV	89MHz	Extrémité avant IFT T101	Minimiser la distorsion à 1/4 de ratation du noyau et vérifier qu'il y a conformité aux spécifications.

**1 : F−401L/HEX1K, HBX1K et F−401/SD seulement*

4.1.3 ETC FM

Etape	Nom du réglage	FM SG (1kHz±75kHz dev.)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Appareil de mesure en S	99MHz	MONO	75dBμV	99MHz NORMAL	VR205	Régler afin que la tension entre TP4 en GND soit de 4,9V $^{+0,05}_{-0,1}$ V.
2	Réglage de niveau de sourdine	99MHz	MONO	12dBμV	99MHz NORMAL	VR204	Régler afin que la sourdine soit relâchée au niveau d'entrée indiqué sur la gauche.

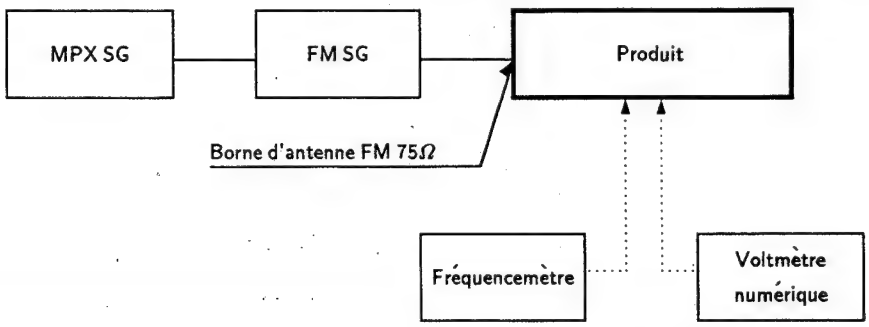


Fig. 4−1 Schéma de connexion de réglage FM

4.2 REGLAGES DU SYNTONISEUR AM

● Raccorder comme indiqué à la Fig. 4−2.

Etape	Nom du réglage	AM SG (400Hz 30% modulation)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Réglage d'alignement *1	603kHz	OFF	Niveau bas d'entrée	603kHz	Bobine ANT du bloc MW (AXX1014)	Régler afin que la tension entre TP9 et GND soit maximale.
		1395kHz	OFF	Niveau bas d'entrée	1395kHz	TC101	
2	Réglage du transformateur de FI *1	603kHz	OFF	Niveau bas d'entrée	603kHz	F301	
3	Appareil de mesure en S	1008kHz	ON	74dBμV/m	1008kHz	VR301	Régler afin que la tension entre TP9 et GND soit 2,5 ±0,05V.

**1 : Réglage pour F−401/HEWIX1K seulement*

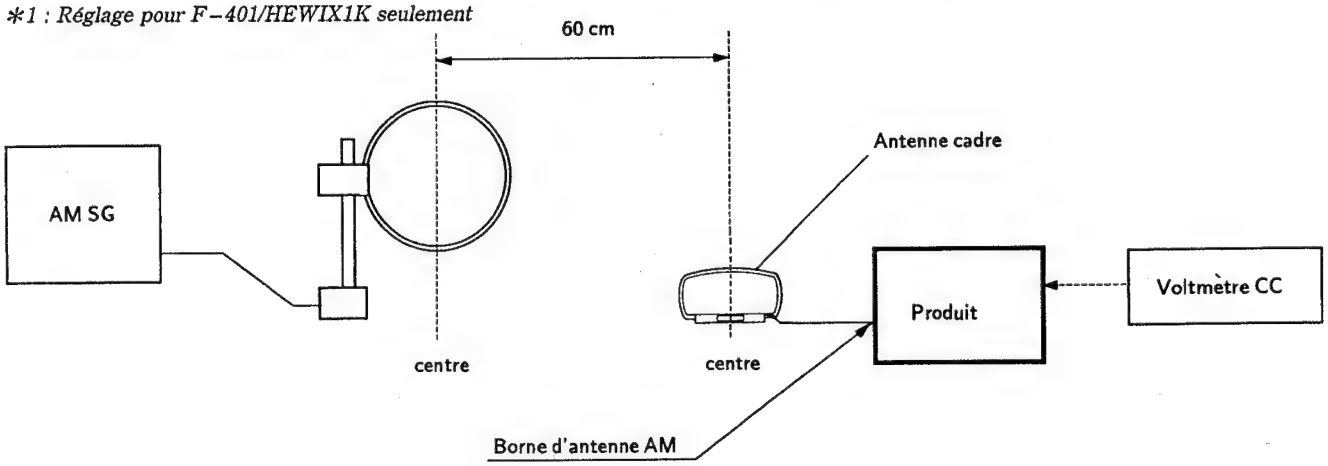


Fig. 4−2 Schéma de connexion de réglage AM

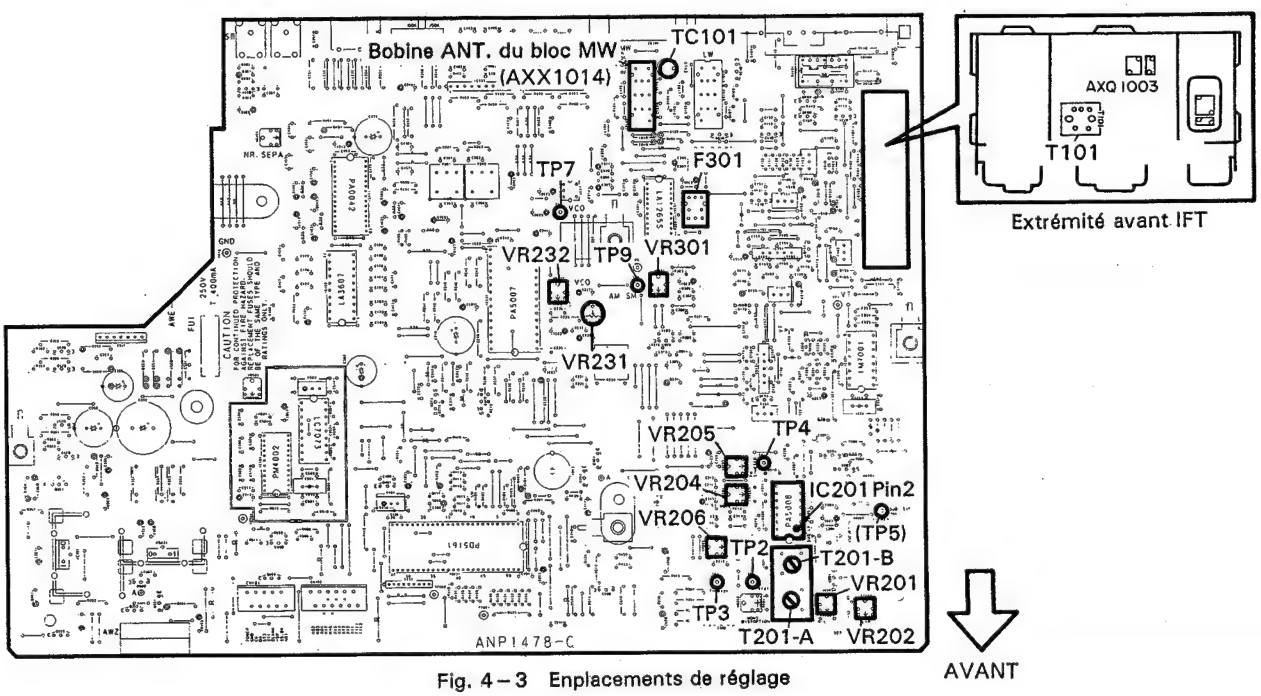


Fig. 4−3 Enplacements de réglage

4. AJUSTES

4.1 AJUSTES DEL SINTONIZADOR DE FM

● Conecte como indica la Fig. 4−1.

4.1.1 FM MONO

Paso	Ajuste	FM SG (1kHz±75kHz dev.)			Visualización fluorescente, banda de FI, etc	Posición	Ajuste
		Frequencia	Modulación	Nivel			
1	Ajuste del medidor T	98MHz	MONO	60dBμV	98MHz NORMAL	T201-B	Ajuste de modo que la tensión entre TP2 y TP3 sea 0±100mV.
2	Ajuste de la distorsión monofónica	98MHz	MONO	60dBμV	98MHz NORMAL	T201-A	Ajuste de modo que la distorsión sea mínima.
3	Ajuste del subbalance	98MHz	MONO	60dBμV	98MHz NORMAL	VR206	Ajuste de modo que la tensión de CA en IC201 Patilla 2 (TP5) sea mínima.

4.1.2 FM STEREO

Modulación de estéreo : Principal 1kHz L+R ±68,25kHz. Piloto 19kHz±6,75kHz

Paso	Ajuste	FM SG (1kHz±75kHz dev.)			Visualización fluorescente, banda de FI, etc	Posición	Ajuste
		Frequencia	Modulación	Nivel			
1	Ajuste del VCO	108MHz	OFF	60dBμV	108MHz	VR231	Ajuste de modo que la salida en TP7 sea 38kHz ±100Hz.
2	Cancelación del piloto	107MHz	PILOT ONLY	60dBμV	107MHz NORMAL	VR232	Ajuste de modo que la tensión de, terminales de salida, CA sea mínima. (MAX LPF : OFF)
3	Ajuste de la separación	89MHz	R-ONLY	60dBμV	89MHz NORMAL	VR202	Ajuste de modo que la separación R → L sea máxima.
4			L-ONLY	60dBμV	89MHz NORMAL	VR201	Ajuste de modo que la separación L → R sea máxima.
5	Ajuste de la distorsión estéreo *1	89MHz	L-ONLY	60dBμV	89MHz	Paso de guia IFT T101	Minimice la distorsión dentro de ratación de 1/4 del núcleo, y compruebe la conformidad con la especificación.

**1 : Solo F−401L/HEX1K, HBX1K y F−401/SD*

4.1.3 FM ETC

Paso	Ajuste	FM SG (1kHz±75kHz dev.)			Visualización fluorescente, banda de FI, etc	Posición	Ajuste
		Frequencia	Modulación	Nivel			
1	Ajuste del medidor S	99MHz	MONO	75dBμV	99MHz NORMAL	VR205	Ajuste de modo que la tensión entre TP4 y masa sea 4,9V $^{+0,05}_{-0,1}$ V.
2	Ajuste del nivel silenciador	99MHz	MONO	12dBμV	99MHz NORMAL	VR204	Ajuste de modo que el silenciamiento se desconecte en el nivel de entrada mostrado a la izquierda.

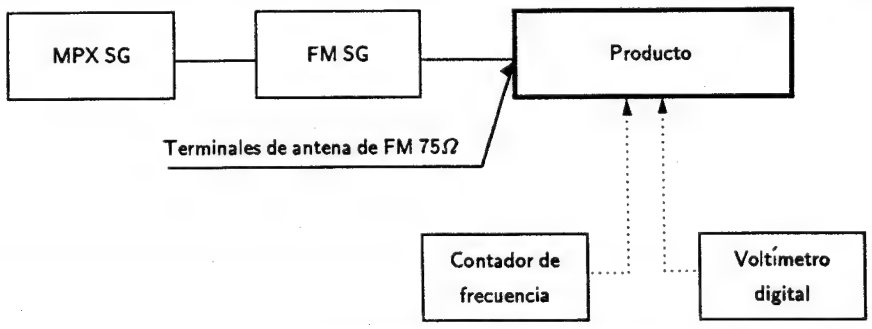


Fig. 4−1 Diagrama de conexiones para el ajuste de FM

4.2 AJUSTES DEL SINTONIZADOR DE AM

● Conecte como indica la Fig. 4−2.

Paso	Ajuste	AM SG (400Hz 30% modulation)			Visualización fluorescente, banda de FI, etc	Posición	Ajuste
		Frequencia	Modulación	Nivel			
1	Ajuste del seguimiento *1	603kHz	OFF	Nivel de entrada bajo	603kHz	Bobina de antena del bloque de MW (AXX1014)	Ajuste de modo que la tensión entre TP9 y masa sea máxima.
		1395kHz	OFF	Nivel de entrada bajo	1395kHz	TC101	
2	Ajuste del IFT *1	603kHz	OFF	Nivel de entrada bajo	603kHz	F301	
3	Ajuste del medidor S	1008kHz	ON	74dBμV/m	1008kHz	VR301	Ajuste de modo que la tensión entre TP9 y masa sea 2,5 ±0,05V.

**1 : Ajuste solo para F−401/HEWIX1K*

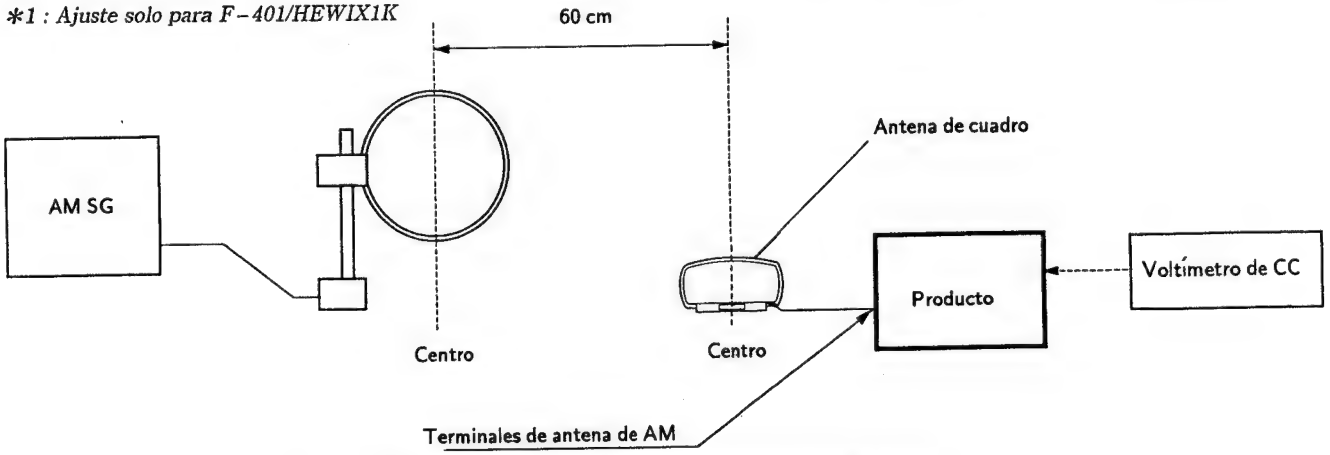


Fig. 4−2 Diagrama de conexiones para el ajuste de AM

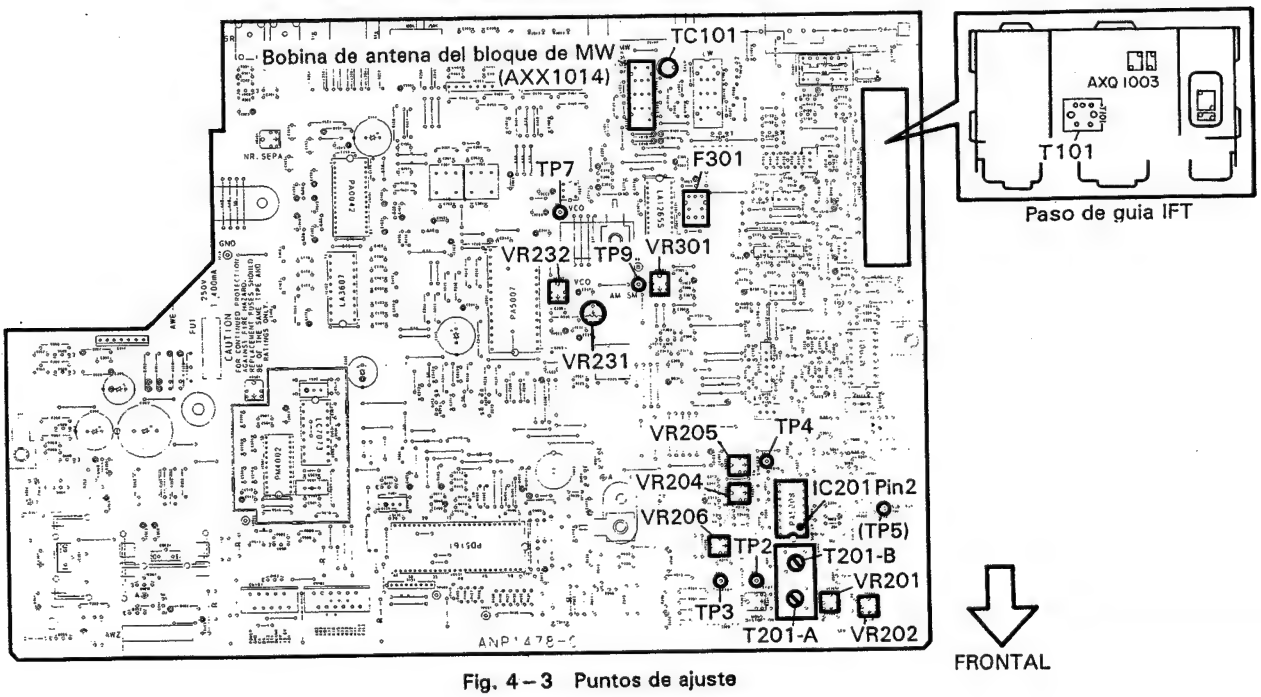


Fig. 4−3 Puntos de ajuste

PIONEER
The Art of Entertainment

Service Manual

ORDER NO.
ARP2243

FM/AM DIGITAL SYNTHESIZER TUNER

F-449
F-449-S
F-449L

F–449, F–449–S AND F–449L HAVE THE FOLLOWING:

Type	Model			Power Requirement	Remarks
	F–449	F–449–S	F–449L		
HEWZ	○	○	–	AC220V–230V, 240V (switchable) *	
HE	–	–	○	AC220V–230V, 240V (switchable) *	
HB	–	–	○	AC220V–230V, 240V (switchable) *	
HIX1B	○	–	–	AC220V–230V, 240V (switchable) *	
HEWX1B	–	–	○	AC220V–230V, 240V (switchable) *	
KU	○	–	–	AC120V only	
SD	○	–	–	AC110V, 120–127V, 220V, 240V (switchable)	

* Change the primary wiring of the power transformer.

- **This manual is applicable to the F–449/HEWZ, F–449–S/HEWZ, F–449L/HE and HB types.**
- **As to the F–449–S/HEWZ, F–449L/HE and HB types, refer to page 30.**
- **As to the other types, refer to applicable service manuals.**
- **The F–449–S is the same as the F–449 except for color.**
- **The F–449L covers MW/LW bands while the F–449 covers MW only.**
- **Ce manuel pour le service comprend les explications de réglage en français.**
- **Este manual de servicio trata del método ajuste escrito en español.**

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 9120 Beveren, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911

SV APR. 1991 Printed in Japan

CONTENTS

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING
Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).
When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

1. SAFETY INFORMATION

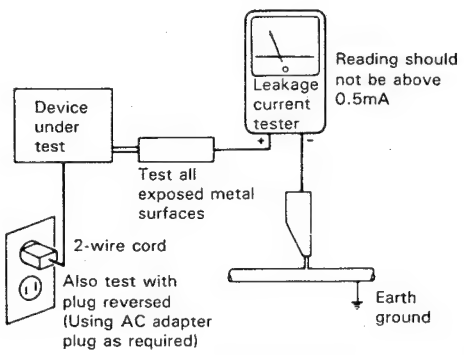
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

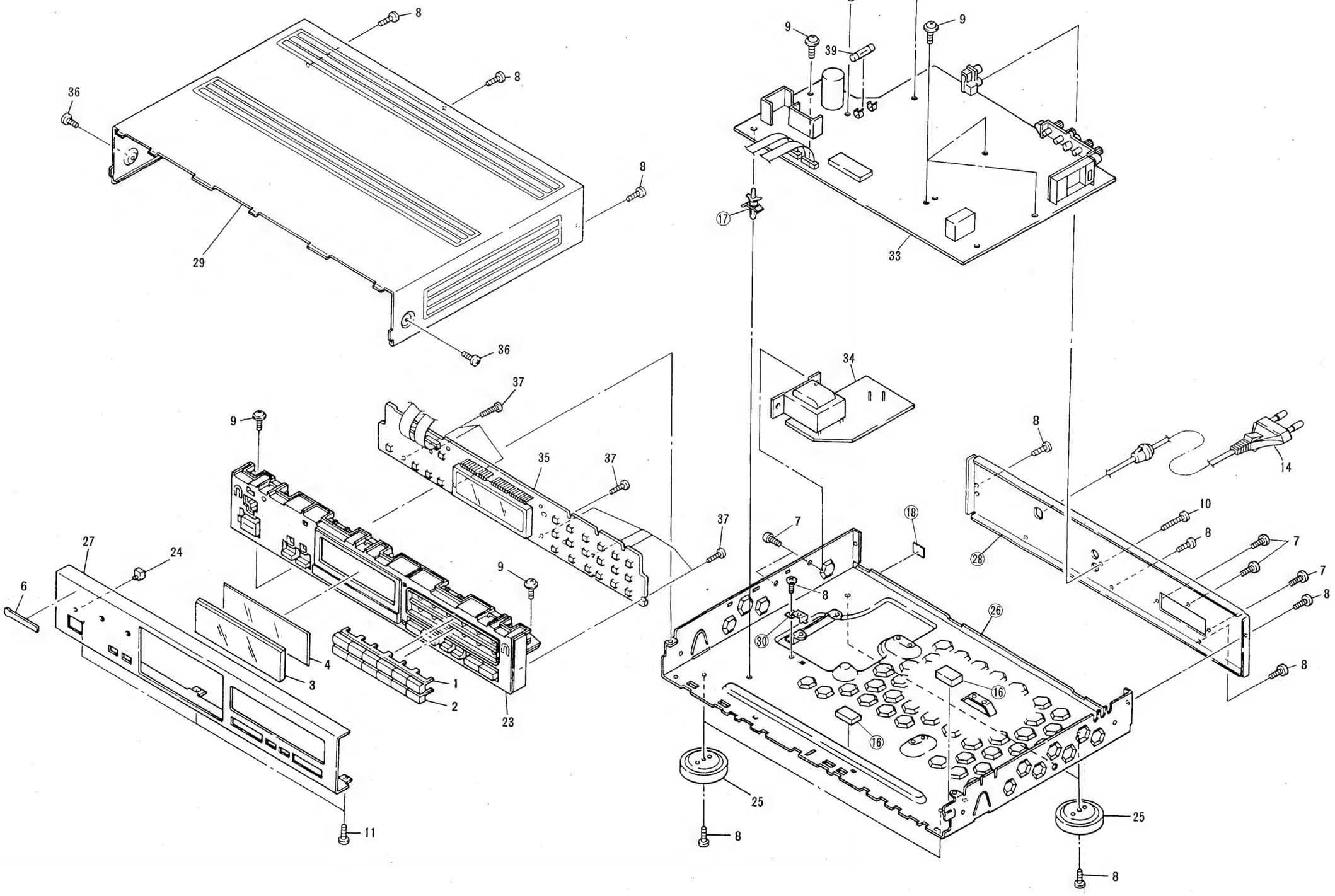
2. PRODUCT SAFETY NOTICE'

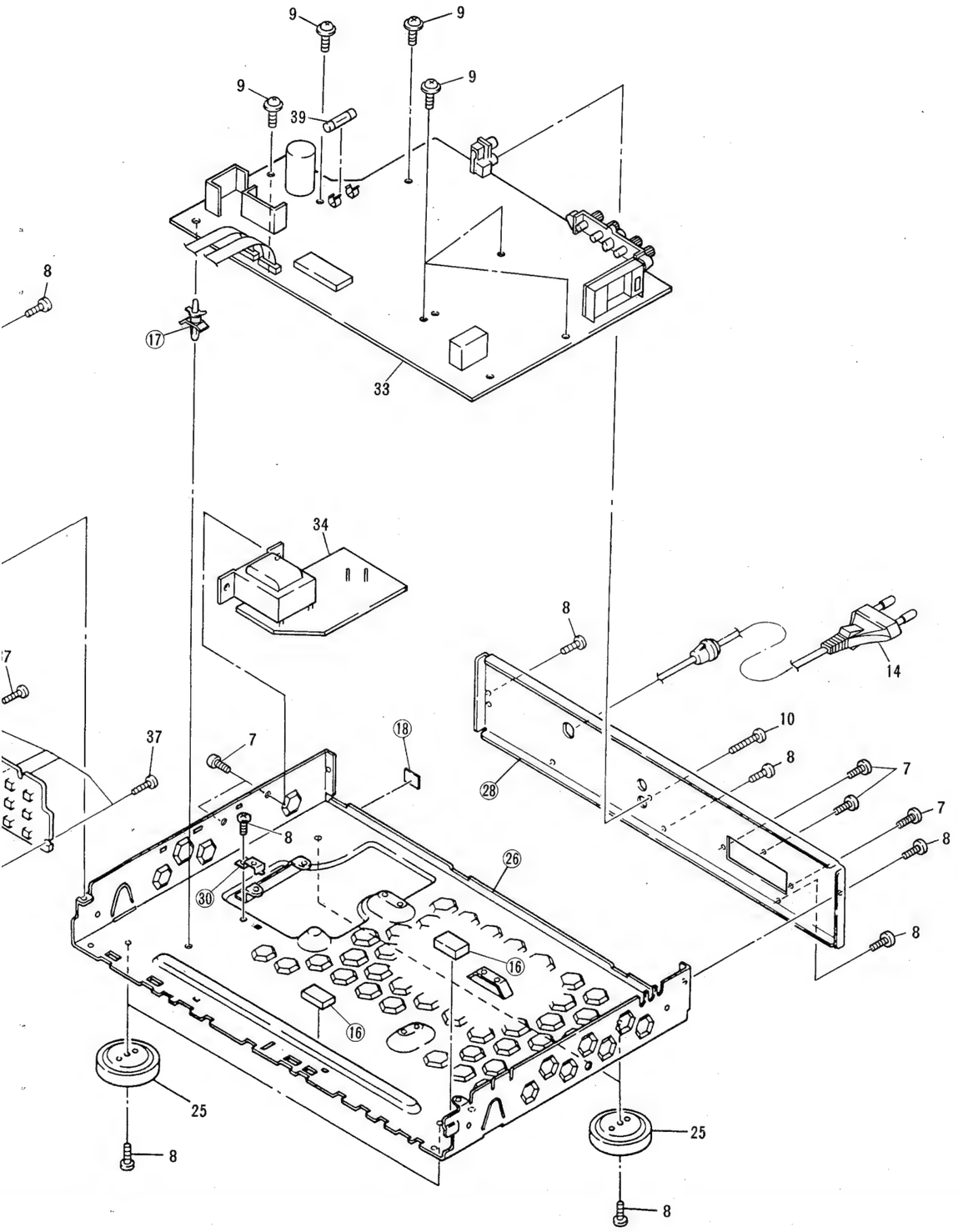
Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.
The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

2. EXPLODED VIEWS, PACKING AND PARTS LIST





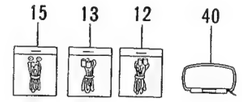
NOTES:

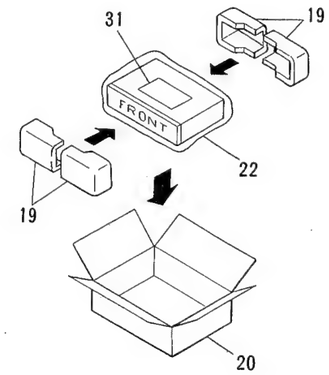
- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Parts List

Mark	No.	Description	Part No.
	1	STATION BUTTON(ABS) (1/13/25 – 6/18/30)	AAD1751
	2	STATION BUTTON(ABS) (7/19/31 – 12/24/36)	AAD1752
	3	PANEL	AAK1685
	4	FL FILTER	AAK1785
	5	.....	
	6	NAME PLATE (METAL)	AAM1029
	7	SCREW	ABA – 298
	8	SCREW (STEEL)	ABA1009
	9	SCREW (STEEL)	ABA1011
	10	SCREW (STEEL)	ABA1047
	11	SCREW (STEEL)	ABA1048
	12	PLUG CORD	ADE – 044
	13	CORD WITH PLUG	ADE – 085
	14	AC POWER CORD	ADG1021
	15	FM ANTENNA	ADH1002
	16	CUSHION (RUBBER)	
	17	PCB SUPPORT	
	18	SPACER	
	19	FRONT REAR PAD	AHA1095
	20	PACKING CASE	AHD2056
	21	.....	
	22	PACKING SHEET	AHG1017
	23	PANEL BASE	AMB1842
	24	INDICATING LENS	AMR1160
	25	INSULATOR ASSY	AMR2140
	26	CHASSIS ASSY	
	27	FRONT PANEL	ANB1451
	28	REAR PANEL	
	29	BONNET	AZN1745
	30	PCB HOLDER	
	31	OPERATING INSTRUCTIONS (GERMAN)	ARC1264
	32	.....	
⊙	33	TUNER ASSEMBLY	AWZ3643
⊙	34	POWER ASSEMBLY	AWZ3649
	35	DISPLAY ASSEMBLY	AWP1036
	36	SCREW	BBT30P060FZK
	37	SCREW	BPZ26P080FMC
	38	.....	
	39	FU101 FUSE (T400MA)	AEK – 504
	40	L1 LOOP ANTENNA	ATB1006

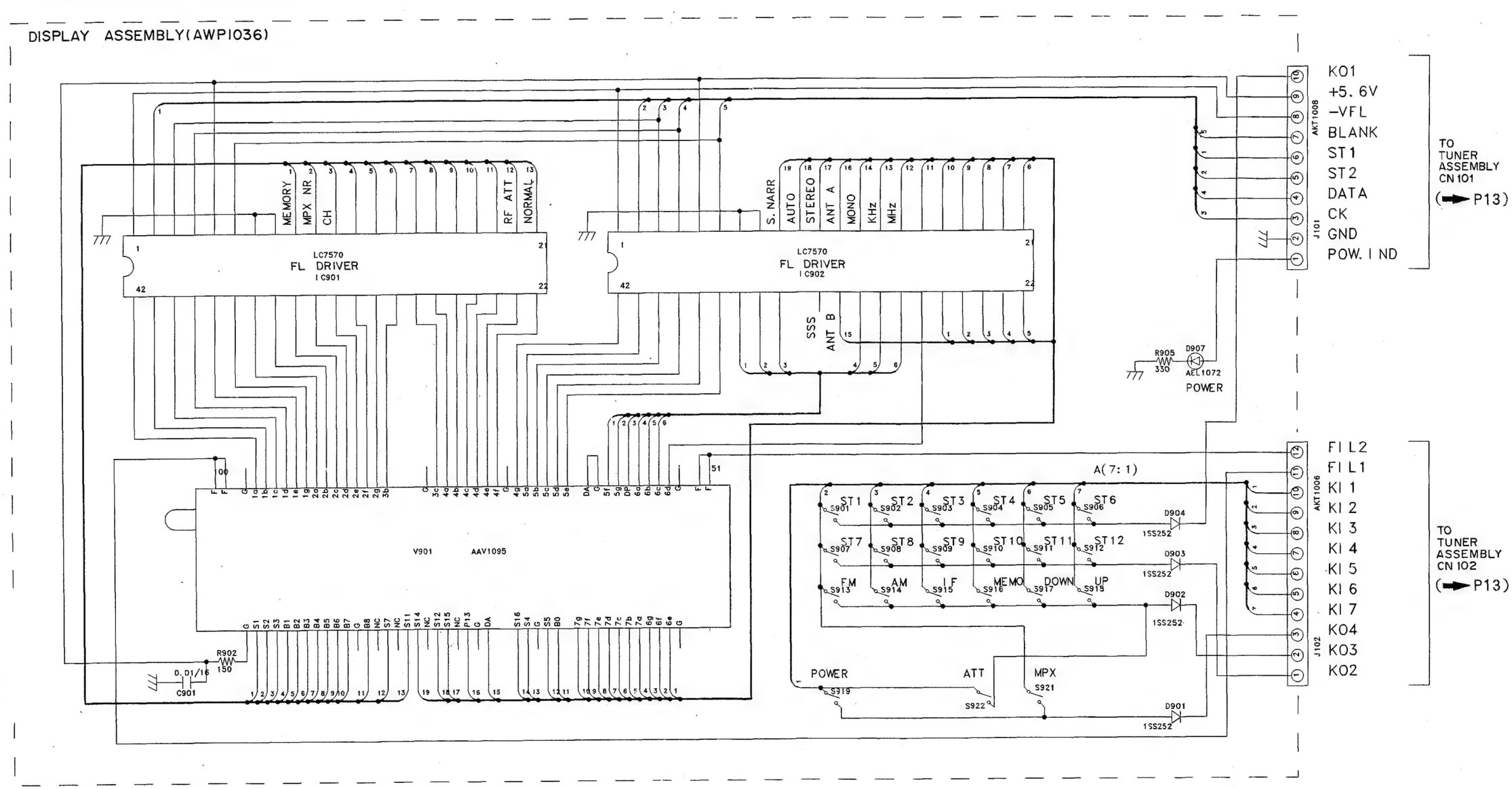
Packing





3. SCHEMATIC DIAGRAM

3.1 DISPLAY ASSEMBLY (AWP1036)



1. RESISTORS
   Indicated in
   noted k ; k
   (M) ; ± 20 %

2. CAPACITOR
   Indicated in
   Indication w

3. VOLTAGE C
   ←mA ; DC
   mV ; Sign
   • The table

4. OTHERS :
   ➡ ; Signal r
   ⊘ ; Adjustir
   The ⚠ mar
   importance
   replacing, be
   ※ marked c

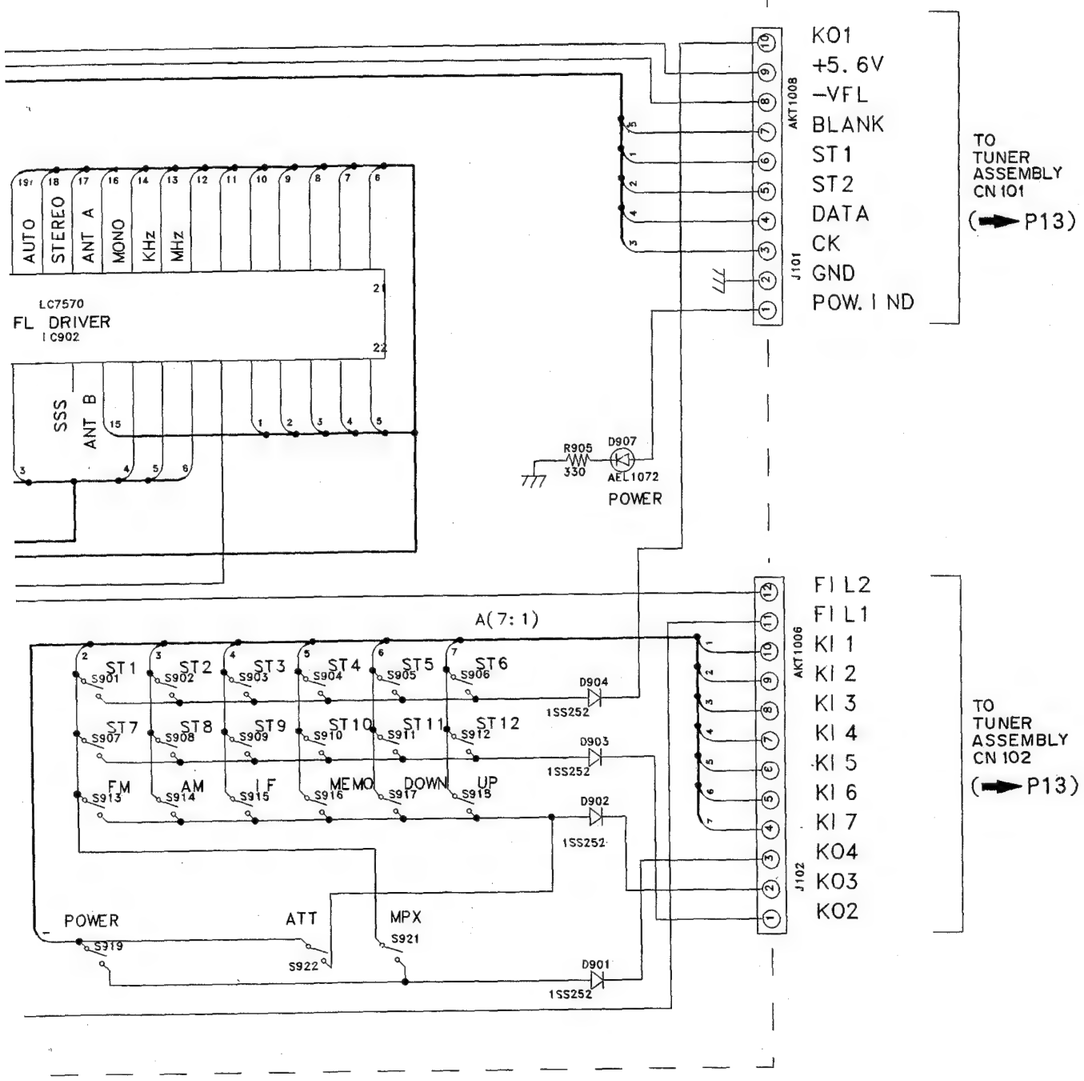
   This is the
   vary due to

IC151
(TA7060AP

Pin No.	Volts
1	1.45
2	1.45
3	0
4	9.14
5	11.3

IC351
(NJM78M56FAS)

Pin No.	Volt
V IN	22.0
V OUT	5.6



1. RESISTORS :
Indicated in Ω, 1/4W, 1/8W, ±5% tolerance unless otherwise noted k ; kΩ, M ; MΩ, (F) ; ±1%, (G) ; ±2%, (K) ; ±10%, (M) ; ±20% tolerance.

2. CAPACITORS :
Indicated in capacity (μF) / voltage (V) unless otherwise noted p ; pF.
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE CURRENT :
⬅mA ; DC current at no input signal.
mV ; Signal voltage at FM 400Hz ± 75Hz DEV.
• The table in the margine shows the DC voltage at no signal.

4. OTHERS :
➡ ; Signal route.
⊘ ; Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5. SWITCHES (Underline indicates switch position)
DISPLAY ASSEMBLY

S901 : ST1	S912 : ST12
S902 : ST2	S913 : FM
S903 : ST3	S914 : AM
S904 : ST4	S915 : IF
S905 : ST5	S916 : MEMO
S906 : ST6	S917 : DOWN
S907 : ST7	S918 : UP
S908 : ST8	S919 : POWER
S909 : ST9	S921 : MPX MODE
S910 : ST10	S922 : RF ATT
S911 : ST11	

IC151 (TA7060AP)

Pin No.	Volts
1	1.45
2	1.45
3	0
4	9.14
5	11.3

IC201 (PA5008)

Pin No.	Volts
1	6.43
2	6.49
3	6.32
4	12.5
5	0
6	3.48
7	3.48
8	3.49
9	2.92
10	6.35
11	0
12	6.44
13	6.4
14	2.27
15	6.42
16	6.42

IC231 (PA5007)

Pin No.	Volts	Pin No.	Volts
1	6.96	16	12.5
2	3.08	17	0
3	3.07	18	0
4	3.07	19	6.23
5	1.43	20	6.23
6	5.34	21	6.23
7	3.09	22	6.23
8	3.09	23	6.2
9	0	24	6.2
10	6.99	25	6.21
11	9.16	26	6.22
12	8.84	27	5.51
13	22.7	28	5.44
14	5.28	29	6.22
15	6.3	30	6.22

IC301 (LA1265S)

Pin No.	Volts	Pin No.	Volts
1	2.31	12	1.47
2	2.31	13	0.6
3	2.31	14	0.9
4	0	15	2.31
5	12.4	16	1.4
6	12.4	17	0
7	12.5	18	0
8	12.4	19	0
9	12.2	20	0.6
10	2.28	21	3.87
11	1.54	22	2.7

IC321 (LM7001)

Pin No.	Volts
1	1.25
2	1.52
3	0
4	0.8
5	1.15
6	0
7	12.4
8	12.4
9	0
10	0
11	2.65
12	5.6
13	5.6
14	0.8
15	0.8
16	0

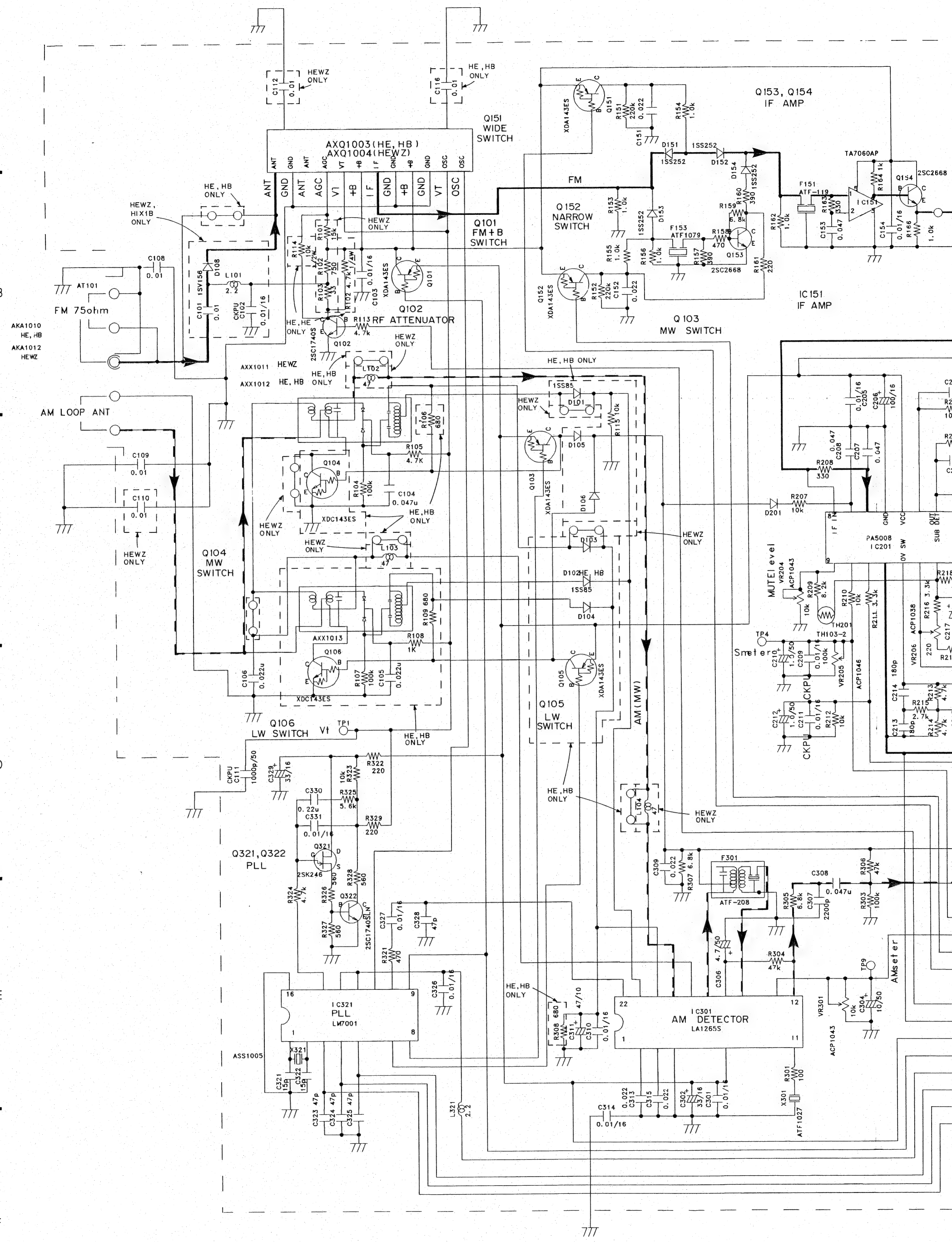
IC351 (NJM78M56FAS)

Pin No.	Volts
V IN	22.0
V OUT	5.6

IC352 (MC7812CT)

Pin No.	Volts
V IN	—
V OUT	12.7

3.2 TUNER ASSEMBLY (1/2) (AWZ3643)



1 2 3 4

5 6 7 8 9

TUNER ASSEMBLY(1/2)
(AWZ3643: HEWZ)
(AWZ3647: HE,HB)

2668

R177 ✱1
F155 ATF-107
1.0k

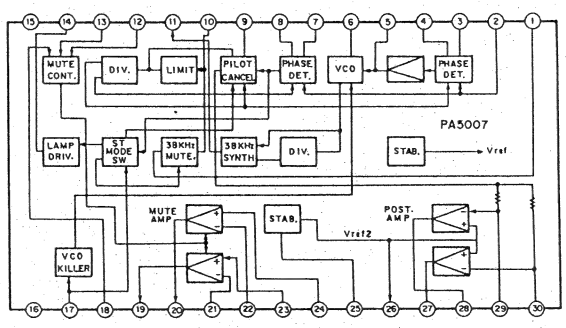
C202 33p
2SK246 Q201 Sepa
R203 10k
VR202 ACP1042 4.7k
R205 3.3k
R202 10k
VR201 4.7kACP1042 Sepa
R204 3.3k
C201 15p
Q201 SWITCH
M. di st
SUB OUT DET
ATE-068 T201
R201 3.6k
TP5
R218 15k
TP2 Vref
C217 100/16
C216 0.01/16
R217 1.8k
R219 47k
IC201 FM DETECTOR
R213 4.7k
R214 4.7k
C215 3.3/50
TP3 Tmeter
Q301 BUFFER
R311 100
Q301 2SC1740S
R309 220
R310 4.7k
CKPU
C312 0.01/16
C305 NP 4.7/35
0 (FM) 9.06(AM)
6.2 (FM) 6.28 (AM)
C203 1.0/50
R206 1.0M
C266 4.7/50
C265 4.7/50
R250 820
R249 820
R243 3.3k
R244 3.3k
R245 22k
R246 22k
✱1
C242 1500p
R241 33k
C243 1500p
R242 33k
C246 0.01/16
C245 470/10
C244 47/10
R238 22k
R237 22k
R239 15k
R240 15k
R247
R248
MUTE
MONO
D233
CKPU
C247 0.01/16
C248 220/16
IC231 DDD TYPE IV PA5007
D234
R231 2.0k
R232 18k
C231 22/25
R233 470
C232 0.047
C234 1.5/50
R234 220
R235 5.6k 1/4W
C236 390p/50
C237 6.8/50
ACP1044
C238 10/50
C239 10/50
TP7
C241 22/25
C240 6800p S
R236 4.7k
D232 1SS252
C233 1500p
C235 10/50
VR231 2.2k
VRTS6VS222
ACG-023 PI LOT. C
VR232 22k
L231 ATM1003
VCO
FM/AM(MW)
HE, HB ONLY
C253 HEWZ ONLY 0.01
C249 4.7/50
L233
HEWZ L232 1.0
C251 4700
R251 1.5k
C250 4.7/50
C252 4700p
R252 1.5k
L234
AKB1039 P HEWZ ONLY
HE, HB ONLY
L
R
MUTE
MONO
STEREO
POW. MUT
FROM TUNER ASSEMBLY(2/2) (➡ P12)

OV. MUTE
FM. SM
AM. SM
NARROW
WI DE
RF. ATT
FM. COMP (for RDS)
+13V
FM+ (for RDS)
+5. 6V
DATA
CK
CE
GND
FROM TUNER ASSEMBLY(2/2) (➡ P12,P13)

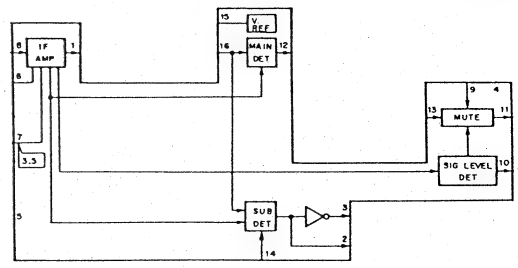
✱1

	R177	R247 R248
HE, HB ONLY	1K	330
HEWZ, ONLY	10K	100

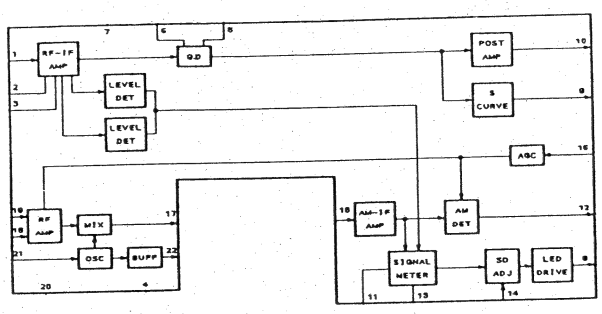
IC231 (PA5007)



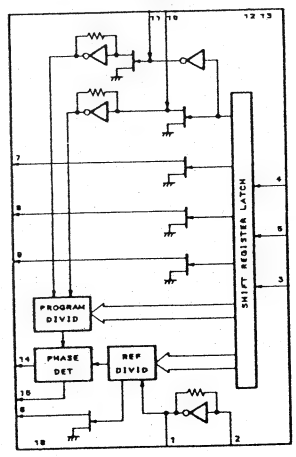
IC201 (PA5008)



IC301 (LA1265S)



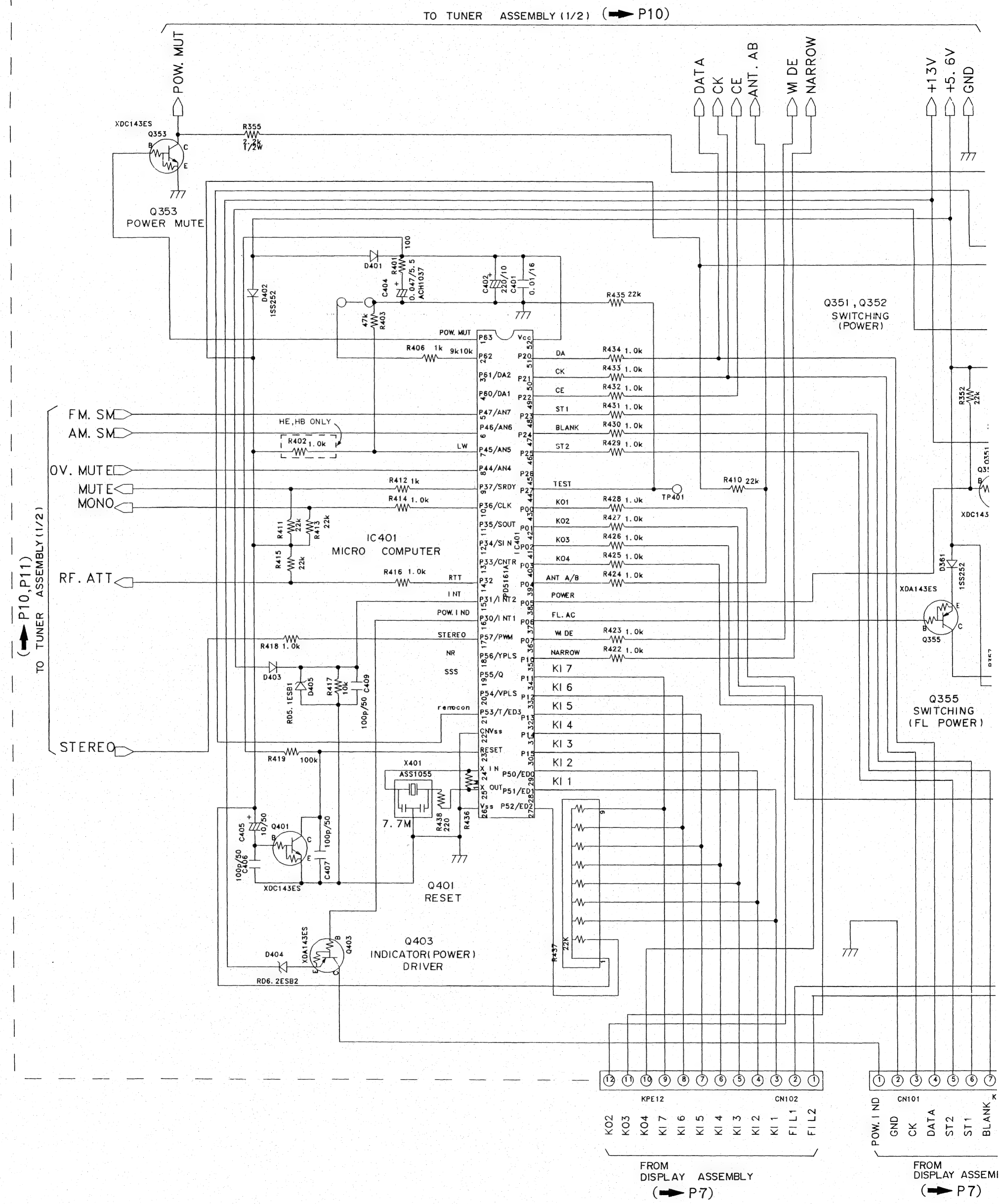
IC321 (LM7001)



11

5 6 7 8 9

3.3 TUNER ASSEMBLY (2/2) (AWZ3643) AND POWER ASSEMBLY (AWZ3649)



TUNER ASSEMBLY (2/2)
(AWZ 3643 : HEWZ)
(AWZ 3647 : HE, HB)

IC351, IC352
REGULATOR

IC351 NJM78M56FAS
IC352 MC7812CT

Q381
REMOCON BUFFER

Q381 2SC1740S

POWER ASSEMBLY

FU1 AEK-504 (T400mA)

L351 ATF-163

ATT1155
PT351

AC POWER CORD
AC 220-230/240V 50/60Hz

ADG1021 : HEWZ
ADG1085 : HB

HEWZ ONLY
HE, HB ONLY

A1
A2 220-230V
A3 240V
A4

(AWZ 3649 : HEWZ)
(AWZ 3653 : HE, HB)

Q354
REGULATOR

3.8vAC

Q356 - Q359
SWITCHING
(FL POWER)

Q356 2SC2878
Q357 2SC2878
Q358 2SC2878
Q359 2SC2878

Line Voltage Selection

Line voltage can be changed with the following steps.
1. Disconnect the AC power cord.
2. Remove the Bonnet case.
3. Change the connection of the power transformer lead wire.
4. Stick the line voltage label on the rear panel.

Port NO.	Description
AXX-193	220V label
AXX-192	240V label

——— 220-230V
-------- 240V

C405

Terminal	Volts
+	5.0
—	0

Q354 (2SB560)

Terminal	Volts
Emitter	−9.1
Collector	−10.5

KPE10
7 8 9 10
BLANK
−VFL
+5.6V
KO1

EMBLY

4. P.C. BOARDS CONNECTION DIAGRAM

NOTE

1. This P.C.B connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the following Table.

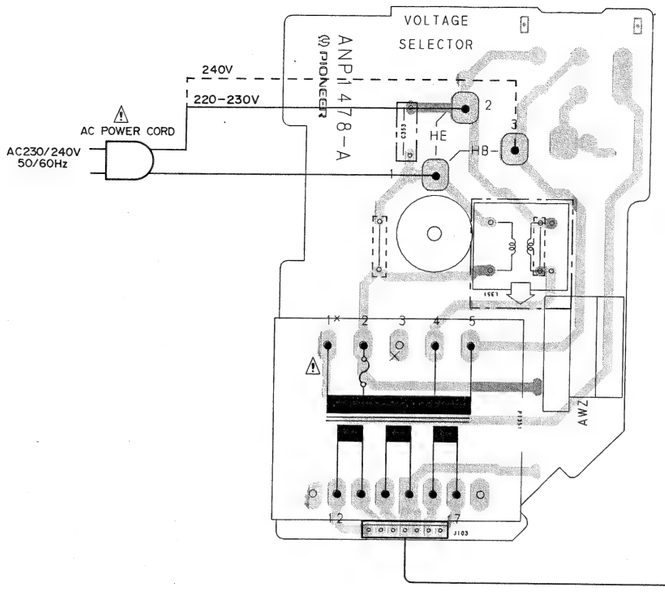
P.C.B. pattern diagram indication	Corresponding part symbol	Part Name
Q504 (E C B)	E C B or E C B	Transistor
Q215 (C B E)	C B E or C B E	Radiator type transistor
D203	D203	Diode
R237	R237	Resistor
C513	+	Capacitor (Polarity)
C518		Capacitor (Non-polarity)

Others

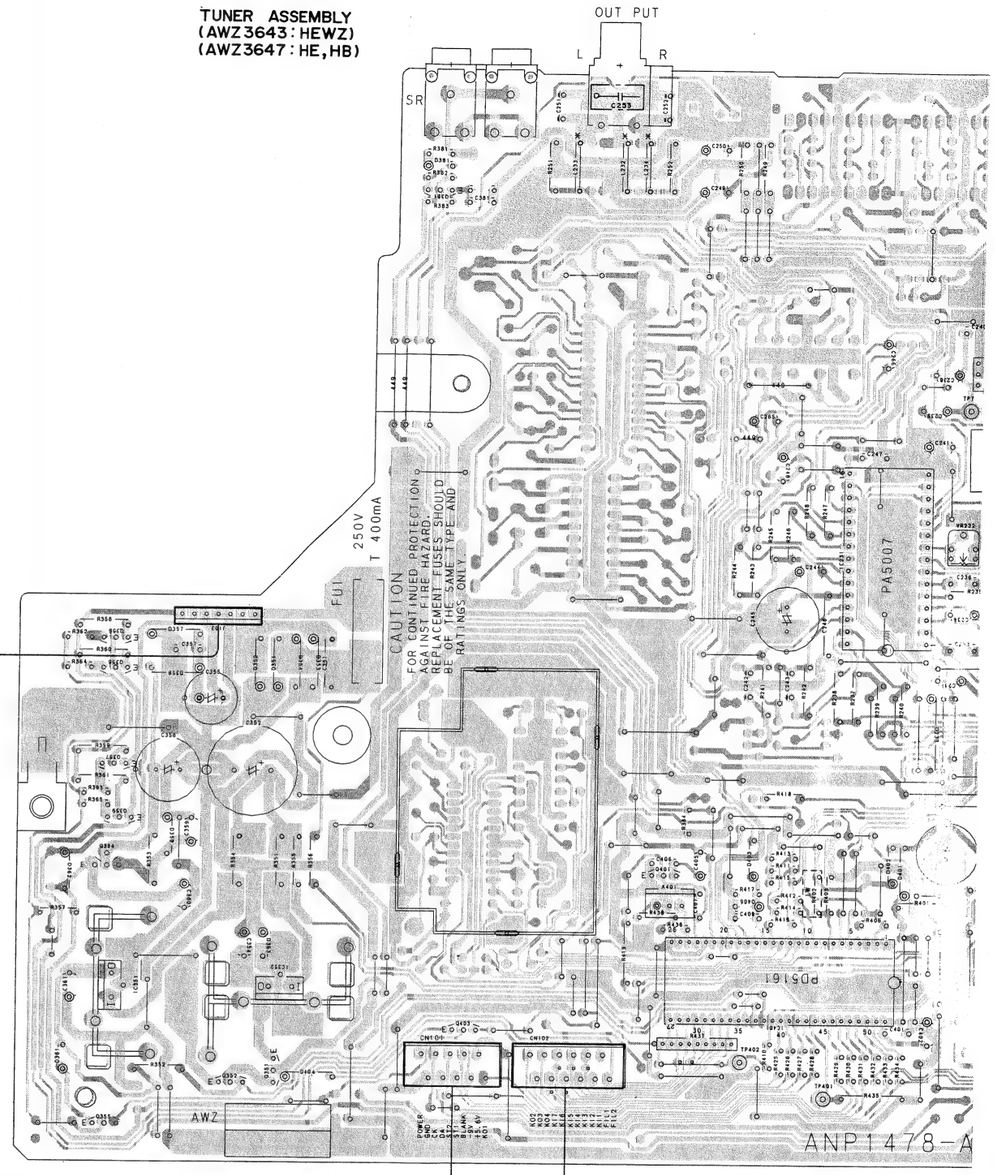
P.C.B. pattern diagram indication	Part Name
IC	IC
S	Switch
RY	Relay
L	Coil
F	Filter
VR	Variable resistor or Semi-fixed resistor

3. The capacitor terminal marked with ⊖ (double circles) shows negative terminal.
4. The diode terminal marked with ⊕ (double circles) shows cathode side.
5. The transistor terminal to which E is affixed shows the emitter.

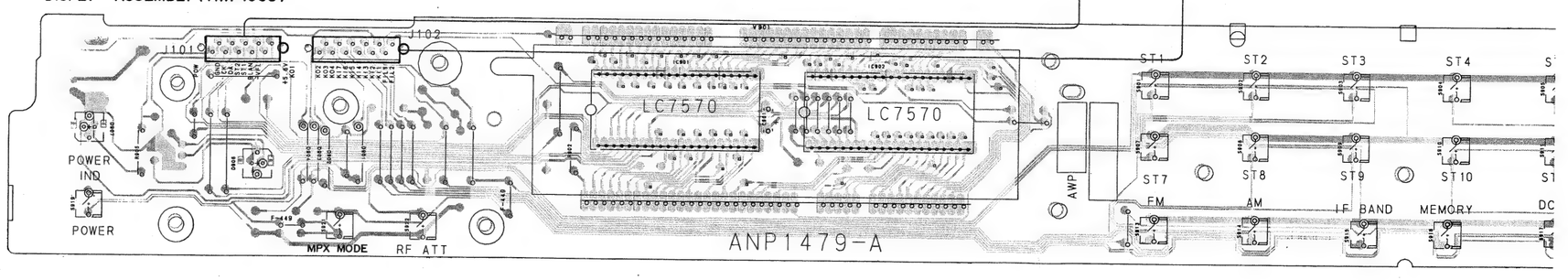
POWER ASSEMBLY
(AWZ3649 : HEWZ)
(AWZ3653 : HE, HB)



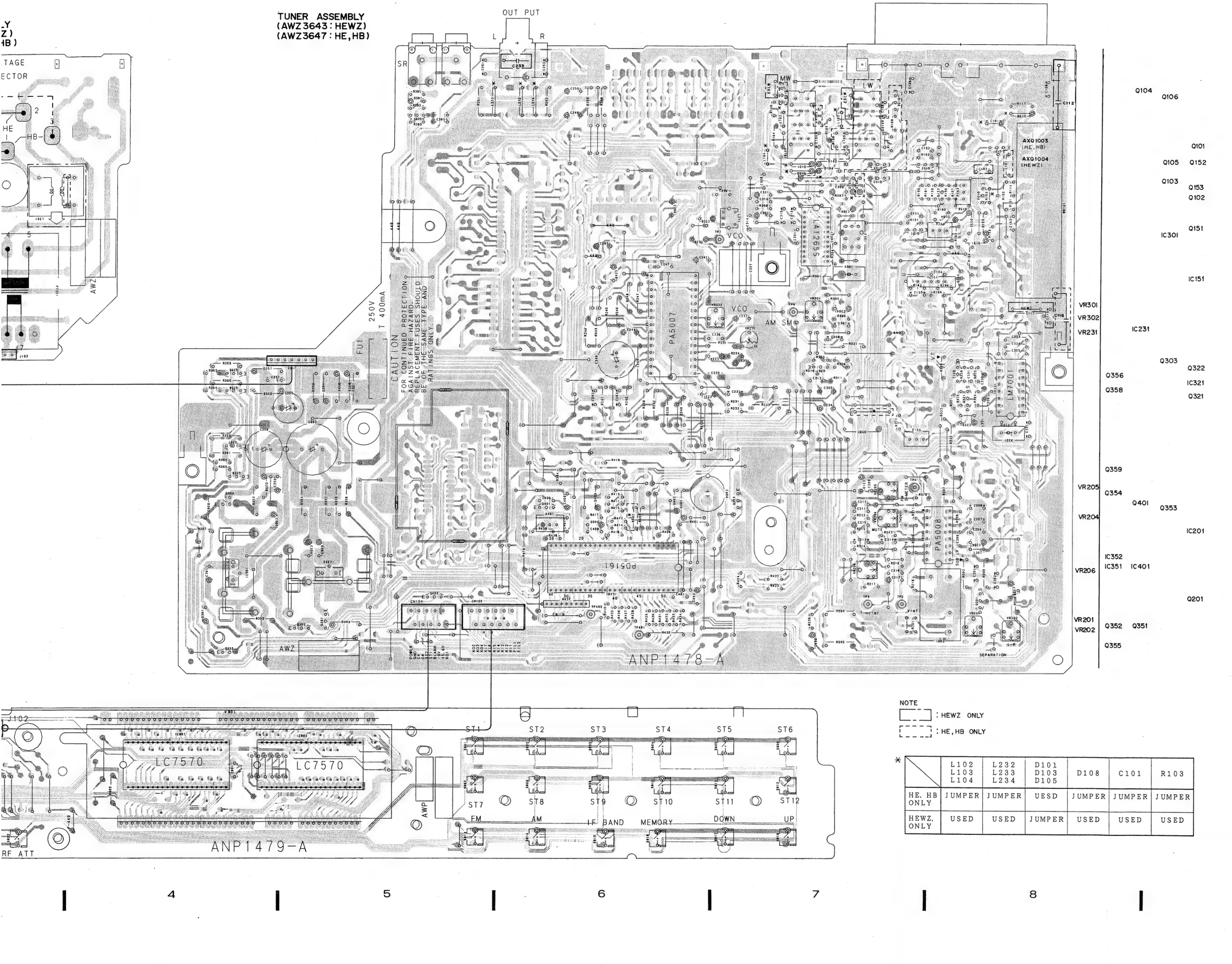
TUNER ASSEMBLY
(AWZ3643 : HEWZ)
(AWZ3647 : HE, HB)



DISPLY ASSEMBLY (AWP1036)



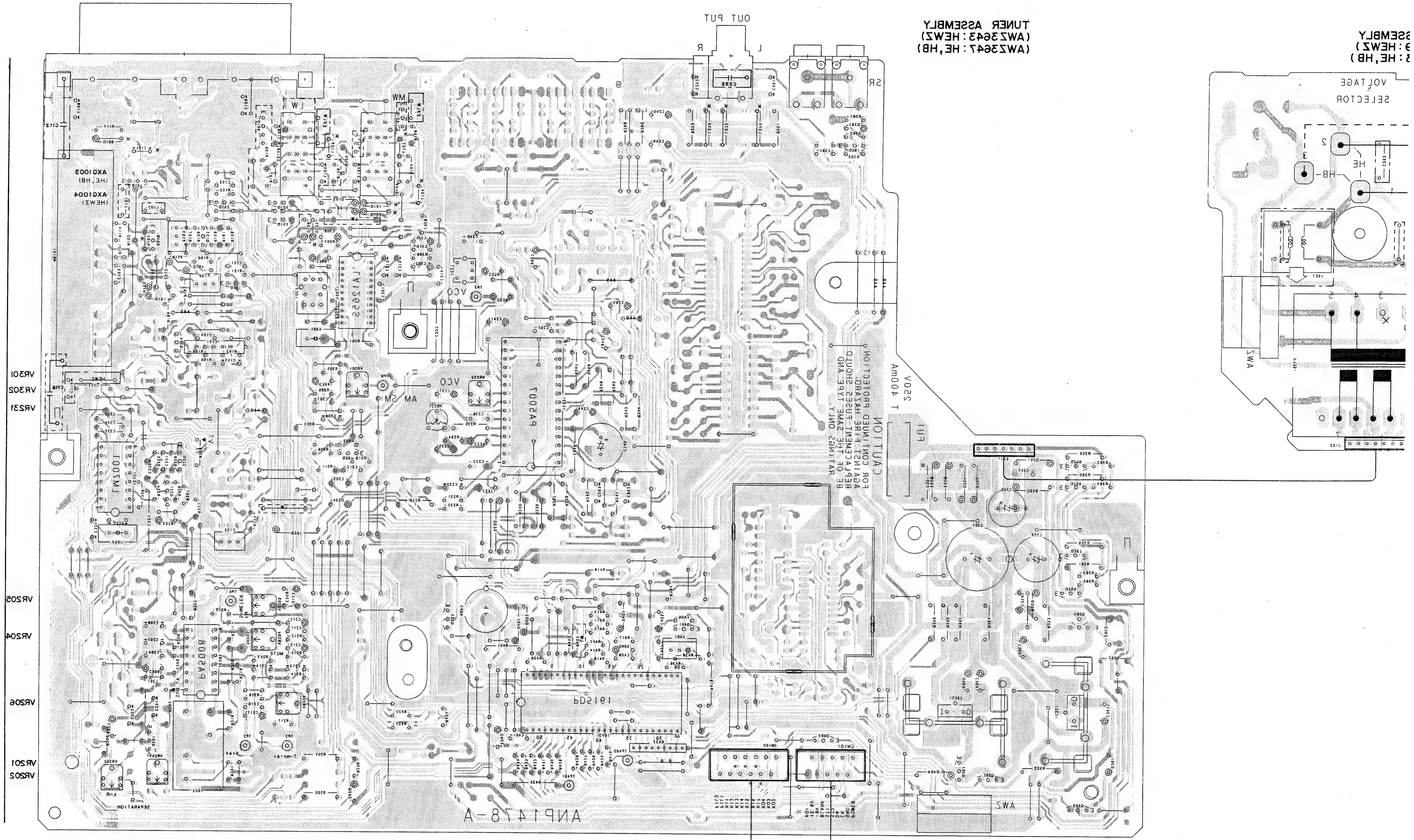
TUNER ASSEMBLY
(AWZ3643 : HEWZ)
(AWZ3647 : HE, HB)

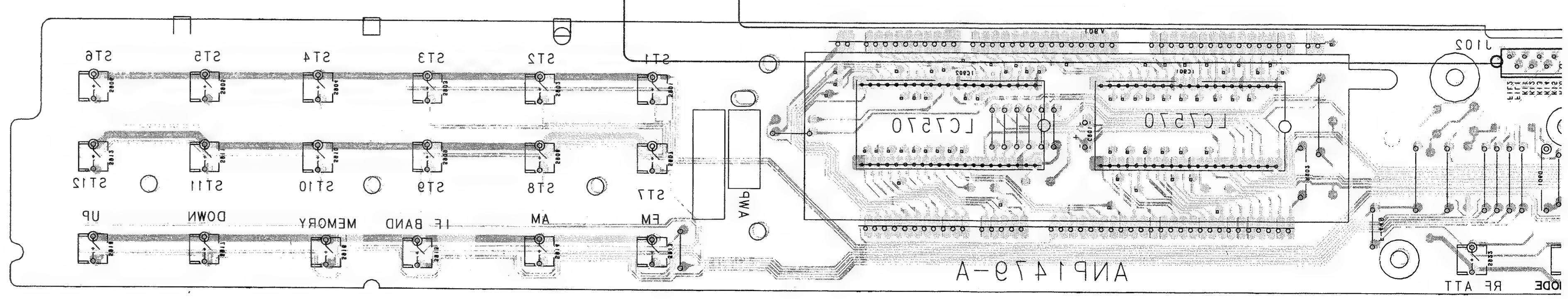


NOTE
: HEWZ ONLY
: HE, HB ONLY

*

	L102 L103 L104	L232 L233 L234	D101 D103 D105	D108	C101	R103
HE, HB ONLY	JUMPER	JUMPER	UESD	JUMPER	JUMPER	JUMPER
HEWZ, ONLY	USED	USED	JUMPER	USED	USED	USED



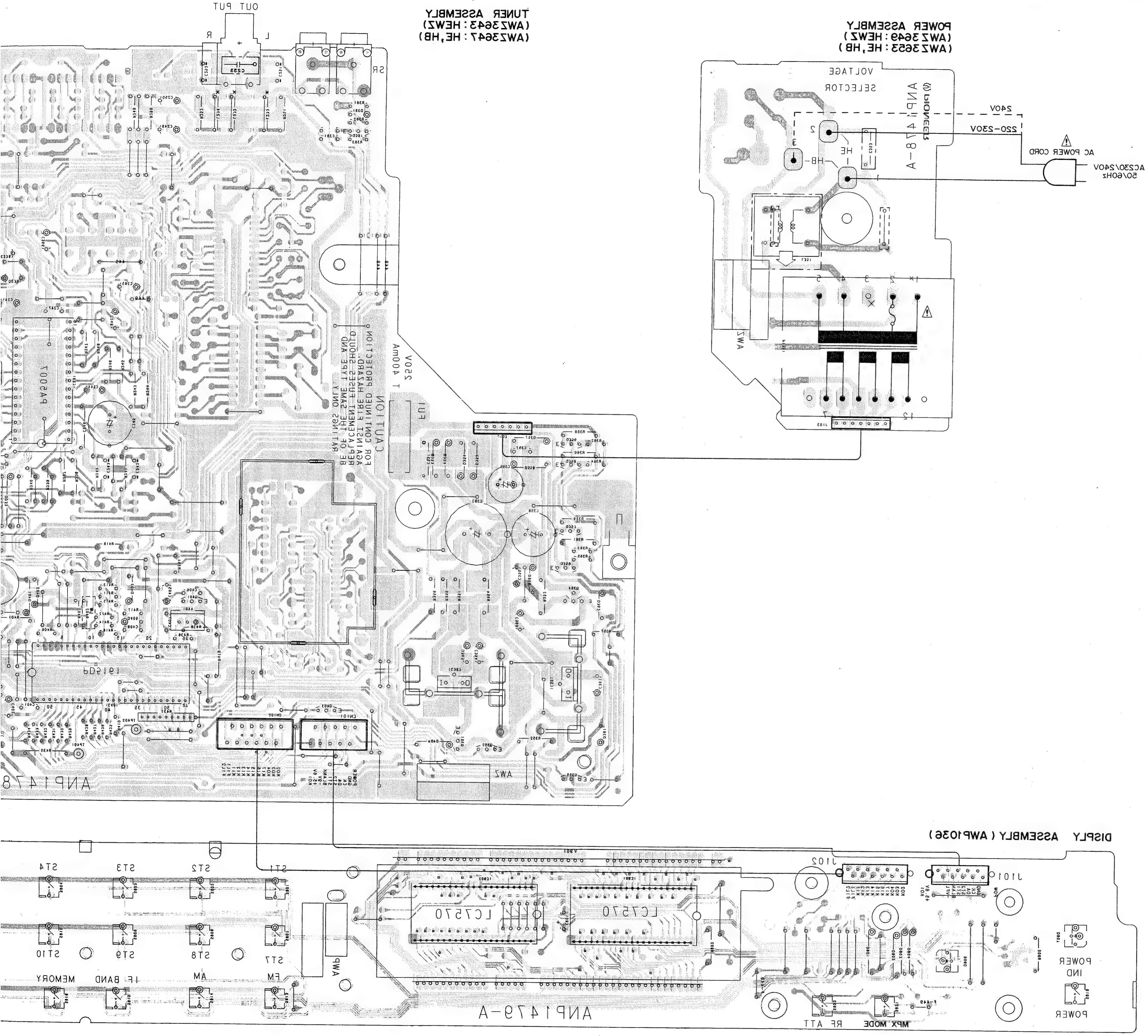


NOTE
: HEWZ ONLY
: HE,HB ONLY

*	L102 L103 L104	L232 L233 L234	D101 D103 D105	D108	C101	R103
HE, HB ONLY	JUMPER	JUMPER	USED	JUMPER	JUMPER	JUMPER
HEWZ ONLY	USED	USED	JUMPER	USED	USED	USED

4. P.C. BOARDS CONNECTION DIAGRAM

• View from soldering side



5. P.C.B's PARTS LIST

NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%)

560 Ω → 56 × 10^1 → 561 ····· RD1/4PS [5][6][1] J
47k Ω → 47 × 10^3 → 473 ····· RD1/4PS [4][7][3] J
0.5 Ω → 0R5 ····· RN2H [0][R][5] K
1 Ω → 010 ····· RS1P [0][1][0] K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω → 562 × 10^1 → 5621 ····· RN1/4SR [5][6][2][1] F

Mark	No.	Description	Part No.
		⊙ TUNER ASSEMBLY(AWZ3643)	
		SEMICONDUCTORS	
	IC151	AMPLIFIER IC	TA7060AP
	IC201	FM IC	PA5008
	IC231	MPX IC	PA5007
	IC301	AM/FM IC	LA1265S
	IC321	PLL IC	LM7001
	IC351	REGULATOR IC	NJM78M56FAS
	IC352	REGULATOR IC	MC7812CT
	IC401		PD5161A
	Q101	TRANSISTOR	XDA143ES
	Q102	TRANSISTOR	2SC1740S
	Q103	TRANSISTOR	XDA143ES
	Q151, 152	TRANSISTOR	XDA143ES
	Q153, 154	TRANSISTOR	2SC2668
	Q201	N-FET	2SK246
	Q301	TRANSISTOR	2SC1740S
	Q321	N-FET	2SK246
	Q322	TRANSISTOR	2SC1740SLN
	Q351	TRANSISTOR	2SA1529
	Q352, 353	TRANSISTOR	XDC143ES
	Q354	TRANSISTOR	2SB560
	Q355	TRANSISTOR	XDA143ES
	Q356-359	TRANSISTOR	2SC2878
	Q381	TRANSISTOR	2SC1740S
	Q401	TRANSISTOR	XDC143ES
	Q403	TRANSISTOR	XDA143ES
	D108	DIODE	1SV156
	D151-154	DIODE	1SS252
	D201	DIODE	1SS252
	D232-234	DIODE	1SS252
⚠	D351-354	DIODE	S5566
⚠	D357, 358	DIODE	S5566
	D359	ZENER DIODE	RD10ESB
	D361	DIODE	1SS252
	D362	ZENER DIODE	RD2.7ESB
	D363	DIODE	1SS252
	D381	DIODE	1SS252
	D401-403	DIODE	1SS252
	D404	ZENER DIODE	RD6.2ESB2
	D405	ZENER DIODE	RD5.1ESB1
	TH201	THERMISTOR	TH103-2
		COILS/TRANSFORMERS	
	L101	AXIAL INDUCTOR	LAU2R2M
	L102-104	AXIAL INDUCTOR	LAU470K
	L231	COIL	ATM1003
	L232	AXIAL INDUCTOR	LAU010M
	L233, 234	AXIAL INDUCTOR	LAU100K
	L321	AXIAL INDUCTOR	LAU2R2M
	T201	IF TRANSFORMER	ATE-068
	F151	CERAMIC FILTER	ATF-119
	F153	CERAMIC FILTER	ATF1079
	F155	CERAMIC FILTER	ATF-107
	F301	CERAMIC FILTER	ATF-208
		CAPACITORS	
	C101	CERAMIC CAPACITOR	CKDYX103M25
	C102, 103	CERAMIC CAPACITOR	CKPUYY103M16
	C104	CERAMIC CAPACITOR	CKDYF473Z50
	C106	CERAMIC CAPACITOR	CKDYF223Z50
	C108-110	CERAMIC CAPACITOR	CKDYX103M25
	C111	CERAMIC CAPACITOR	CKPUYB102K50
	C112	CERAMIC CAPACITOR	CKDYX103M25
	C151, 152	CERAMIC CAPACITOR	CKDYF223Z50
	C153	CERAMIC CAPACITOR	CKDYX473M25
	C154	CERAMIC CAPACITOR	CKPUYY103M16
	C201	CERAMIC CAPACITOR	CCMCH150J50
	C202	CERAMIC CAPACITOR	CCMCH330J50
	C203	ELECTR. CAPACITOR	CEAS010M50
	C205	CERAMIC CAPACITOR	CKPUYY103M16
	C206	ELECTR. CAPACITOR	CEAS101M16
	C207, 208	CERAMIC CAPACITOR	CKDYX473M25
	C209	CERAMIC CAPACITOR	CKPUYY103M16
	C210	ELECTR. CAPACITOR	CEAS010M50
	C211	CERAMIC CAPACITOR	CKPUYY103M16
	C212	ELECTR. CAPACITOR	CEAS010M50

Mark	No.	Description	Part No.
	C213, 214	CERAMIC CAPACITOR	CKMYB181K50
	C215	ELECTR. CAPACITOR	CEAS3R3M50
	C216	CERAMIC CAPACITOR	CKPUYY103M16
	C217	ELECTR. CAPACITOR	CEAS101M16
	C231	ELECTR. CAPACITOR	CEAS220M25
	C232	AUDIO FILM CAPACITOR	CFTXA473J50
	C233	CERAMIC CAPACITOR	CKDYB152K50
	C234	ELECTR. CAPACITOR	CEAS1R5M50
	C235	ELECTR. CAPACITOR	CEAS100M50
	C236	CKA (390P/50V)	ACG-023
	C237	ELECTR. CAPACITOR	CEAS6R8M50
	C238, 239	ELECTR. CAPACITOR	CEAS100M50
	C240	PL. STYRENE CAPACITOR	CQSA682J50
	C241	ELECTR. CAPACITOR	CEAS220M25
	C242, 243	MYLOR FILM CAPACITOR	CQMA152J50
	C244	ELECTR. CAPACITOR	CEAS470M10
	C245	ELECTR. CAPACITOR	CEAS471M10
	C246, 247	CERAMIC CAPACITOR	CKPUYY103M16
	C248	ELECTR. CAPACITOR	CEAS221M16
	C249, 250	ELECTR. CAPACITOR	CEAS4R7M50
	C251, 252	CERAMIC CAPACITOR	CKDYB472K50
	C253	CERAMIC CAPACITOR	CKDYX103M25
	C265, 266	ELECTR. CAPACITOR	CEAS4R7M50
	C301	CERAMIC CAPACITOR	CKPUYY103M16
	C302	ELECTR. CAPACITOR	CEAS330M16
	C304	ELECTR. CAPACITOR	CEAS100M50
	C305	ELECTR. CAPACITOR	CEANP4R7M35
	C306	ELECTR. CAPACITOR	CEAS4R7M50
	C307	CERAMIC CAPACITOR	CKDYB222K50
	C308	CERAMIC CAPACITOR	CKDYX473M25
	C309	CERAMIC CAPACITOR	CKDYF223Z50
	C310	CERAMIC CAPACITOR	CKPUYY103M16
	C311	ELECTR. CAPACITOR	CEAS470M10
	C312	CERAMIC CAPACITOR	CKPUYY103M16
	C313	CERAMIC CAPACITOR	CKDYF223Z50
	C314	CERAMIC CAPACITOR	CKPUYY103M16
	C315	CERAMIC CAPACITOR	CKDYF223Z50
	C321, 322	CERAMIC CAPACITOR	CCMCH150J50
	C323-325	AXIAL CERAMIC C.	CCPUSL470J50
	C326, 327	CERAMIC CAPACITOR	CKPUYY103M16
	C328	AXIAL CERAMIC C.	CCPUSL470J50
	C329	ELECTR. CAPACITOR	CEAS330M16
	C330	AUDIO FILM CAPACITOR	CFTXA224J50
	C331	CERAMIC CAPACITOR	CKPUYY103M16
⚠	C351	CAPACITOR (CERAMIC)	ACG-009
	C352	ELECTR. CAPACITOR	CEAS222M50
	C354	ELECTR. CAPACITOR	CEAS330M16
	C355	ELECTR. CAPACITOR	CEAS221M10
	C357	CERAMIC CAPACITOR	CKDYF473Z50
	C358	ELECTR. CAPACITOR	CEAS471M25
	C359	ELECTR. CAPACITOR	CEAS470M25
	C360	ELECTR. CAPACITOR	CEAS101M16
	C361	ELECTR. CAPACITOR	CEAS470M10
	C381	CERAMIC CAPACITOR	CKPUYB101K50

Mark	No.	Description	Part No.
	C401	CERAMIC CAPACITOR	CKPUYY103M16
	C402	ELECTR. CAPACITOR	CEAS221M10
	C404	CEA (47000/5.5V)	ACH1037
	C405	ELECTR. CAPACITOR	CEAS100M50
	C406, 407	CERAMIC CAPACITOR	CKPUYB101K50
	C409	CERAMIC CAPACITOR	CKPUYB101K50

RESISTORS

	R101	CARBONFILM RESISTOR	RD1/8PM□□□J
	R102	CARBONFILM RESISTOR	RD1/2PM□□□J
	R103-105	CARBONFILM RESISTOR	RD1/8PM□□□J
	R113	CARBONFILM RESISTOR	RD1/8PM□□□J
	R151-164	CARBONFILM RESISTOR	RD1/8PM□□□J
	R166	CARBONFILM RESISTOR	RD1/8PM□□□J
	R177	CARBONFILM RESISTOR	RD1/8PM□□□J
	R201-219	CARBONFILM RESISTOR	RD1/8PM□□□J
	R231-234	CARBONFILM RESISTOR	RD1/8PM□□□J
	R235	METALFILM RESISTOR	RN1/4PQ□□□□F
	R236-252	CARBONFILM RESISTOR	RD1/8PM□□□J
	R301	CARBONFILM RESISTOR	RD1/8PM□□□J
	R303-307	CARBONFILM RESISTOR	RD1/8PM□□□J
	R309-311	CARBONFILM RESISTOR	RD1/8PM□□□J
	R321-329	CARBONFILM RESISTOR	RD1/8PM□□□J
	R351	CARBONFILM RESISTOR	RD1/2PM□□□J
	R352	CARBONFILM RESISTOR	RD1/8PM□□□J
	R353	CARBONFILM RESISTOR	RD1/2PM□□□J
⚠	R354	FUSLIBLE RESISTOR	RFA1/4PS□□□J
	R355	CARBONFILM RESISTOR	RD1/2PM□□□J
	R356, 357	CARBONFILM RESISTOR	RD1/8PM□□□J
	R358-361	CARBONFILM RESISTOR	RD1/4PM□□□J
	R362-365	CARBONFILM RESISTOR	RD1/8PM□□□J
	R381-384	CARBONFILM RESISTOR	RD1/8PM□□□J
	R401	CARBONFILM RESISTOR	RD1/8PM□□□J
	R403	CARBONFILM RESISTOR	RD1/8PM□□□J
	R406	CARBONFILM RESISTOR	RD1/8PM□□□J
	R410-419	CARBONFILM RESISTOR	RD1/8PM□□□J
	R422-436	CARBONFILM RESISTOR	RD1/8PM□□□J
	R437	RESISTOR ARRAY(22K)	RA8T□□□J
	R438	CARBONFILM RESISTOR	RD1/8PM□□□J
	VR201, 202	VR	ACP1042
	VR204	VR	ACP1043
	VR205	VR	ACP1046
	VR206	VR	ACP1038
	VR231	VR	VRTS6VS222
	VR232	VR	ACP1044
	VR301	VR	ACP1043

OTHERS

SCREW		ABA-298
ANTENNA TERMINAL 2-P		AKA1012
PIN JACK(2P)		AKB1039
JACK		AKN-207
FRONT END MODULE ASSEMBLY		AXQ1004
AM RF TUNING BLOCK		AXX1011
CN101	CONNECTOR(10P)	KPE10
CN102	CONNECTOR(12P)	KPE12

Mark	No.	Description	Part No.
	X301	CERAMIC RESONATOR	ATF1027
	X321	CRYSTAL RESONATOR	ASS1005
	X401	CERAMIC RESONATOR	ASS1055

⊙ POWER ASSEMBLY(AWZ3649)

COILS/TRANSFORMERS

Mark	No.	Description	Part No.
⚠	L351	FILTER	ATF-163
⚠	T351	POWER TRANSFORMER	ATT1155

CAPACITORS

Mark	No.	Description	Part No.
⚠	C353	CKA (0.01/AC400V)	ACG1002

DISPLAY ASSEMBLY(AWP1036)

SEMICONDUCTORS

Mark	No.	Description	Part No.
	IC901,902	FL STATIC DRIVER IC	LC7570
	D901-904	DIODE	1SS252
	D907	LED	AEL1072

SWITCHES

Mark	No.	Description	Part No.
	S901-919	SWITCH	ASG1034
	S921,922	SWITCH	ASG1034

CAPACITORS

Mark	No.	Description	Part No.
	C901	CERAMIC CAPACITOR	CKPUYY103M16

RESISTORS

Mark	No.	Description	Part No.
	R902	CARBONFILM RESISTOR	RD1/8PM□□□J
	R905	CARBONFILM RESISTOR	RD1/8PM□□□J

OTHERS

Mark	No.	Description	Part No.
	V901	FL TUBE	AAV1095

FRONT END MODULE ASSEMBLY (AXQ1004)

The component parts of Front End Module assembly (AXQ1004) cannot be supplied.

6. ADJUSTMENTS

6.1 FM TUNER ADJUSTMENTS

- Connect as shown in Fig. 6–1.

6.1.1 FM MONO

Step	Adjustment name	FM SG (1 kHz ± 75 kHz dev.)			FL display, IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	T meter adjustment	98 MHz	MONO	60 dB μ	98 MHz NORMAL	T201–B	Adjust so that the voltage between TP2 and TP3 becomes 0 ± 100 mV.
2	MONO distortion adjustment	98 MHz	MONO	60 dB μ	98 MHz NORMAL	T201–A	Adjust so that the distortion becomes minimum.
3	Sub–balance adjustment	98 MHz	MONO	60 dB μ	98 MHz NORMAL	VR206	Adjust so that the AC voltage at IC201 pin 2 becomes minimum.

6.1.2 FM STEREO

Step	Adjustment name	FM SG (1 kHz ± 75 kHz dev.)			FL display, IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	VCO adjustment	108 MHz	OFF	60 dB μ	108 MHz	VR231	Adjust so that the output at TP7 becomes 38 kHz ± 100 Hz.
2	Pilot cancel	107 MHz	PILOT ONLY	60 dB μ	107 MHz NORMAL	VR232	Adjust so that the AC voltage at output terminal becomes minimum. (MAX LPF: OFF)
3	Separation adjustment	89 MHz	R–ONLY	60 dB μ	89 MHz NORMAL	VR202	Adjust so that the separation R → L becomes maximum.
4			L–ONLY	60 dB μ	89 MHz NORMAL	VR201	Adjust so that the separation L → R becomes maximum.

Stereo modulation: Main 1 kHz L+R ± 68.25 Hz, Pilot 19 kHz ± 6.75 kHz.

6.1.3 FM ETC

Step	Adjustment name	FM SG (1 kHz ± 75 kHz dev.)			FL display, IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	S meter adjustment	99 MHz	MONO	75 dB μ	99 MHz NORMAL	VR205	Adjust so that the voltage between TP4 and GND becomes $4.9^{+0.05}_{-0.1}$ V.
2	Muting level adjustment	99 MHz	MONO	12 dB μ	99 MHz NORMAL	VR204	Adjust so that the muting is released at the input level shown on the left.

6.2 AM TUNER ADJUSTMENTS

- Connect as shown in Fig. 6–2.

Step	Adjustment name	FM SG (400 Hz 30% modulation)			FL display, IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	Tracking adjustment * 1	603 kHz	OFF	Low input level	603 kHz	ANT coil of MW block	Adjust so that the voltage between TP9 and GND becomes maximum.
		1395 kHz	OFF	Low input level	1395 kHz	TC101	
2	IFT adjustment * 1	603 kHz	OFF	Low input level	603 kHz	F301	
3	S meter adjustment	1008 kHz	ON	74 dB μV/m	1008 kHz	VR301	Adjust so that the voltage between TP9 and GND becomes 2.5 ± 0.05V.

*1: Adjustment only for HIX1B.

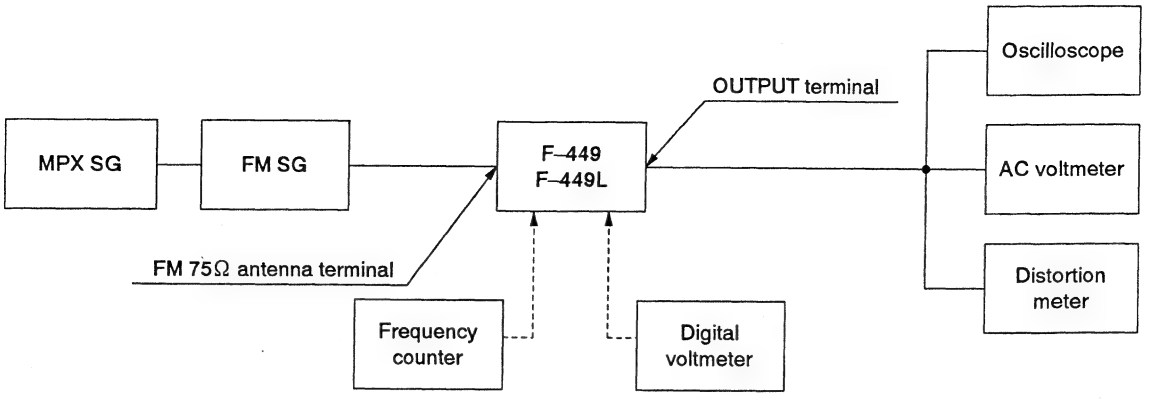


Fig. 6–1 FM Tuner Connection

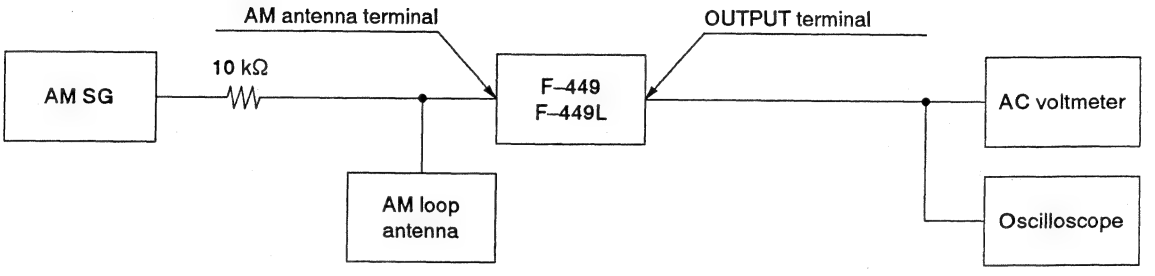


Fig. 6–2 AM Tuner Connection

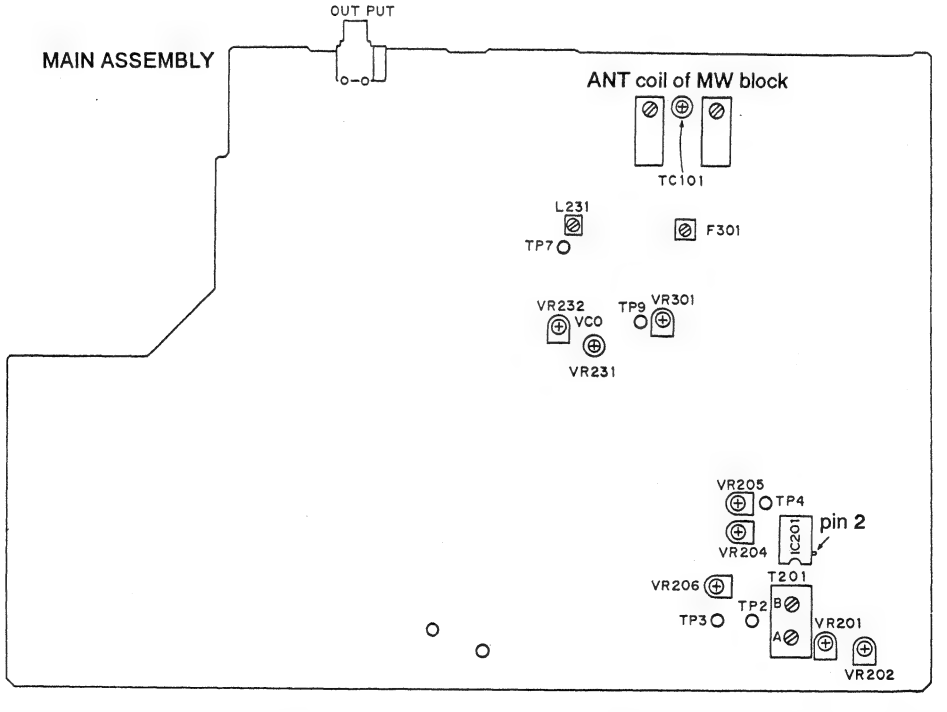


Fig. 6–3 Adjusting Point

6. RÉGLAGES

6.1 RÉGLAGES DU SYNTONISEUR FM

• Raccorder comme indiqué à la figure 6–1.

6.1.1 MONO FM

Etape	Nom du réglage	FM SG (1 kHz ± 75 kHz dev.)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Appareil de mesure en T	98 MHz	MONO	60 dB µ	98 MHz NORMAL	T201–B	Régler afin que la tension entre TP2 et TP3 soit de 0 ± 100 mV.
2	Réglage de distorsion MONO	98 MHz	MONO	60 dB µ	98 MHz NORMAL	T201–A	Régler afin que la distorsion soit minimale.
3	Réglage de l'équilibre auxiliaire	98 MHz	MONO	60 dB µ	98 MHz NORMAL	VR206	Régler afin que la tension CA à IC201 Broche 2 soit minimale.

6.1.2 STEREO FM

Etape	Nom du réglage	FM SG (1 kHz ± 75 kHz dev.)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Réglage du VCO	108 MHz	OFF	60 dB µ	108 MHz	VR231	Régler afin que la sortie à TP7 soit de 38 kHz ± 100 Hz
2	Neutralisation pilote	107 MHz	PILOT ONLY	60 dB µ	107 MHz NORMAL	VR232	Régler afin que la tension CA, bornes de sortie, soit minimale. (MAX LPF: HORS CIRCUIT)
3	Réglage de séparation	89 MHz	R–ONLY	60 dB µ	89 MHz NORMAL	VR202	Régler afin que la séparation D → G soit maximale.
4			L–ONLY	60 dB µ	89 MHz NORMAL	VR201	Régler afin que la séparation G → D soit maximale.

Modulation de stéréo: Principalé 1 kHz L+R ± 68,25 Hz, Pilote 19 kHz ± 6,75 kHz.

6.1.3 ETC FM

Etape	Nom du réglage	FM SG (1 kHz ± 75 kHz dev.)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Appareil de mesure en S	99 MHz	MONO	75 dB µ	99 MHz NORMAL	VR205	Régler afin que la tension entre TP4 en GND soit $4{,}9^{+0{,}05}_{-0{,}1}$ V.
2	Réglage de niveau de sourdine	99 MHz	MONO	12 dB µ	99 MHz NORMAL	VR204	Régler afin que la sourdine soit relâchée au niveau d'entrée indiqué sur la gauche.

6.2 RÉGLAGES DU SYNTONISEUR AM

• Raccorder comme indiqué à la figure 6–2.

Etape	Nom du réglage	FM SG (400 Hz 30% modulation)			Affichage FL, GAMME FI, etc.	Réglage	Fréquence
		Modulation	Niveau	Emplacemer			
1	Réglage d'alignement * 1	603 kHz	OFF	Niveau bas d'entrée	603 kHz	Bobine ANT du bloc OM	Régler afin que la tension entre TP9 et GND soit maximale.
		1395 kHz	OFF	Niveau bas d'entrée	1395 kHz	TC101	
2	Réglage du transformateur de FI * 1	603 kHz	OFF	Niveau bas d'entrée	603 kHz	F301	
3	Appareil de mesure en S	1008 kHz	ON	74 dB µV/m	1008 kHz	VR301	Régler afin que la tension entre TP9 et GND soit 2,5 ± 0,05V.

* 1: Réglage pour HIX1B seulement.

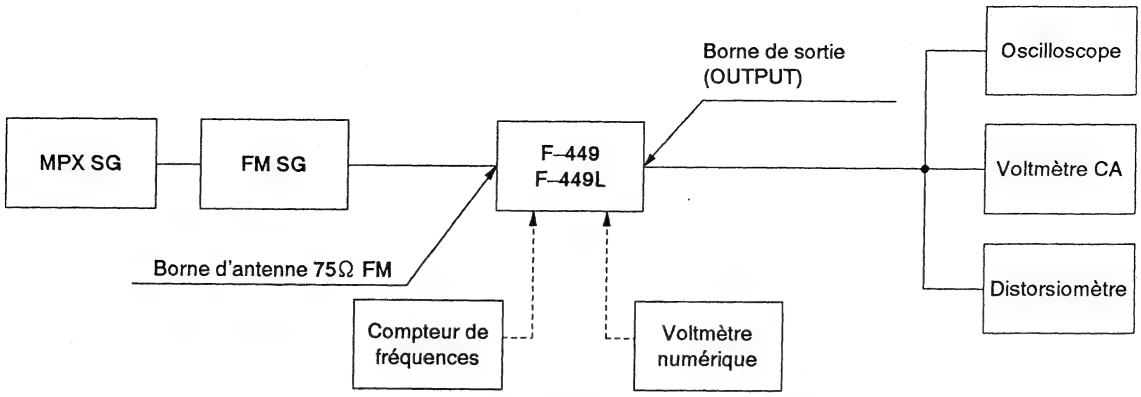


Fig. 6–1 Branchement du syntoniseur FM

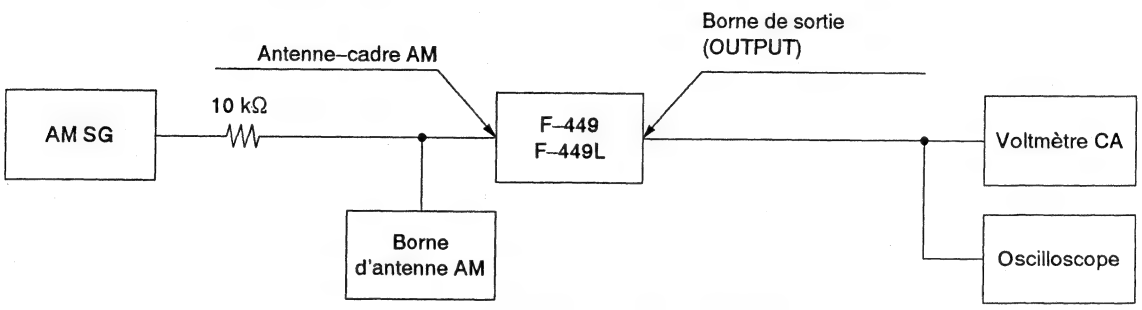


Fig. 6–2 Branchement du syntoniseur FM

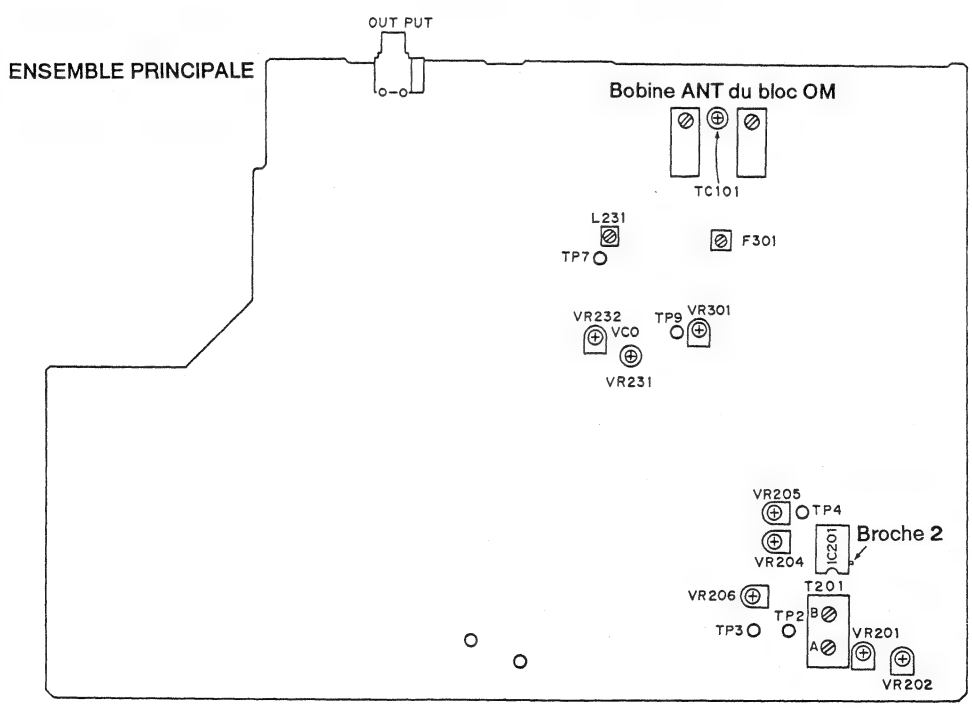


Fig. 6–3 Point de réglage

6. AJUSTES

6.1 AJUSTES DEL SINTONIZADOR DE FM

- Conecte como indica la Fig. 6–1.

6.1.1 FM MONO

Paso	Ajuste	FM SG (1 kHz ± 75 kHz dev.)			Visualización fluorescente, banda de FI, etc.	Posición	Ajuste
		Frecuencia	Modulación	Nivel			
1	Ajuste del medidor T	98 MHz	MONO	60 dB µ	98 MHz NORMAL	T201–B	Ajuste de modo que la tensión entre TP2 y TP3 sea 0 ± 100 mV.
2	Ajuste de la distorsión monofónica	98 MHz	MONO	60 dB µ	98 MHz NORMAL	T201–A	Ajuste de modo que la distorsión sea mínima.
3	Ajuste del subbalance	98 MHz	MONO	60 dB µ	98 MHz NORMAL	VR206	Ajuste de modo que la tensión de CA en IC201 patilla 2 sea mínima.

6.1.2 FM STEREO

Paso	Ajuste	FM SG (1 kHz ± 75 kHz dev.)			Visualización fluorescente, banda de FI, etc.	Posición	Ajuste
		Frecuencia	Modulación	Nivel			
1	Ajuste del VCO	108 MHz	OFF	60 dB µ	108 MHz	VR231	Ajuste de modo que la salida en TP7 sea 38 kHz ± 100 Hz
2	Cancelación del piloto	107 MHz	PILOT ONLY	60 dB µ	107 MHz NORMAL	VR232	Ajuste de modo que la tensión de, terminales de salida, CA sea mínima (MAX LPF: OFF)
3	Ajuste de la separación	89 MHz	R–ONLY	60 dB µ	89 MHz NORMAL	VR202	Ajuste de modo que la separación R→L sea máxima.
4			L–ONLY	60 dB µ	89 MHz NORMAL	VR201	Ajuste de modo que la separación L→R sea máxima.

Modulación de estéreo: Principal 1 kHz L+R ± 68,25 Hz, Piloto 19 kHz ± 6,75 kHz.

6.1.3 FM ETC

Paso	Ajuste	FM SG (1 kHz ± 75 kHz dev.)			Visualización fluorescente, banda de FI, etc.	Posición	Ajuste
		Frecuencia	Modulación	Nivel			
1	Ajuste del medidor S	99 MHz	MONO	75 dB µ	99 MHz NORMAL	VR205	Ajuste de modo que la tensión entre TP4 y masa sea $4{,}9^{+0{,}05}_{-0{,}1}$ V.
2	Ajuste del nivel silenciador	99 MHz	MONO	12 dB µ	99 MHz NORMAL	VR204	Ajuste de modo que el silenciamiento se desconecte en el nivel de entrada mostrado a la izquierda.

6.2 AJUSTES DEL SINTONIZADOR DE AM

- Conecte como indica la Fig. 6–2.

Paso	Ajuste	FM SG (400 Hz 30% modulación)			Visualización fluorescente, banda de FI, etc.	Posición	Ajuste
		Frecuencia	Modulación	Nivel			
1	Ajuste del seguimiento * 1	603 kHz	OFF	Nivel de entrada bajo	603 kHz	Bobina de antena del bloque de MW	Ajuste de modo que la tensión entre TP9 y masa sea màxima.
		1395 kHz	OFF	Nivel de entrada bajo	1395 kHz	TC101	
2	Ajuste del IFT * 1	603 kHz	OFF	Nivel de entrada bajo	603 kHz	F301	
3	Ajuste del medidor S	1008 kHz	ON	74 dB µV/m	1008 kHz	VR301	Ajuste de modo que la tensión entre TP9 y masa sea 2,5 ± 0,05V

* 1: Ajuste sólo para HIX1B.

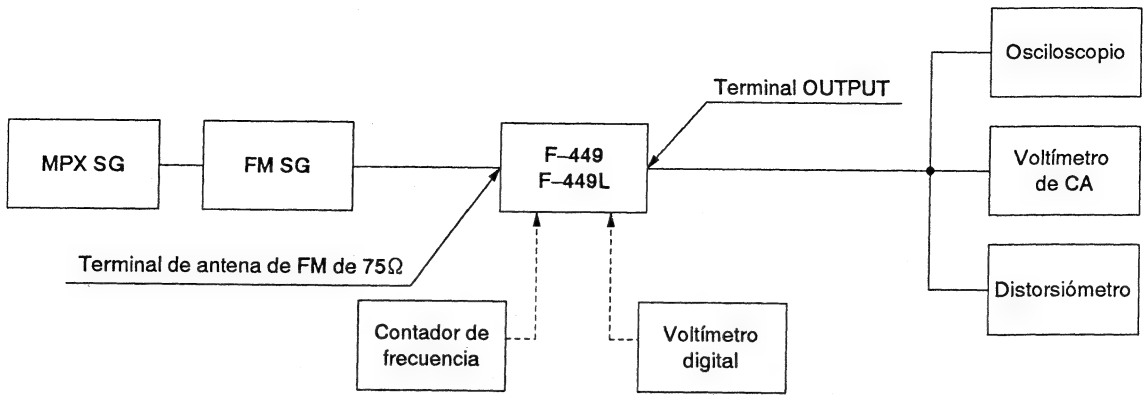


Fig. 6–1 Conexión del sintonizador de FM

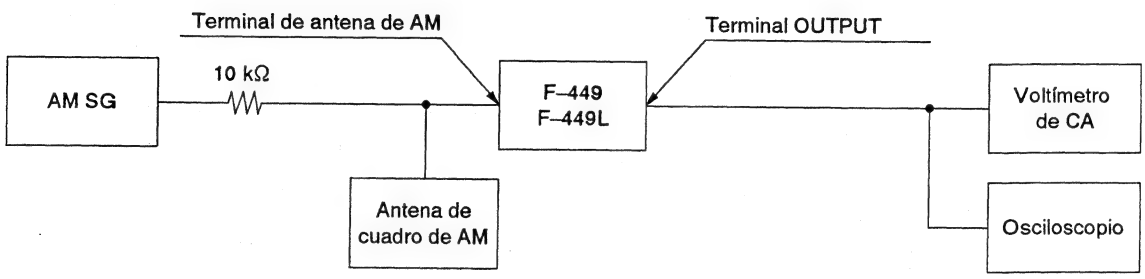


Fig. 6–2 Conexión del sintonizador de AM

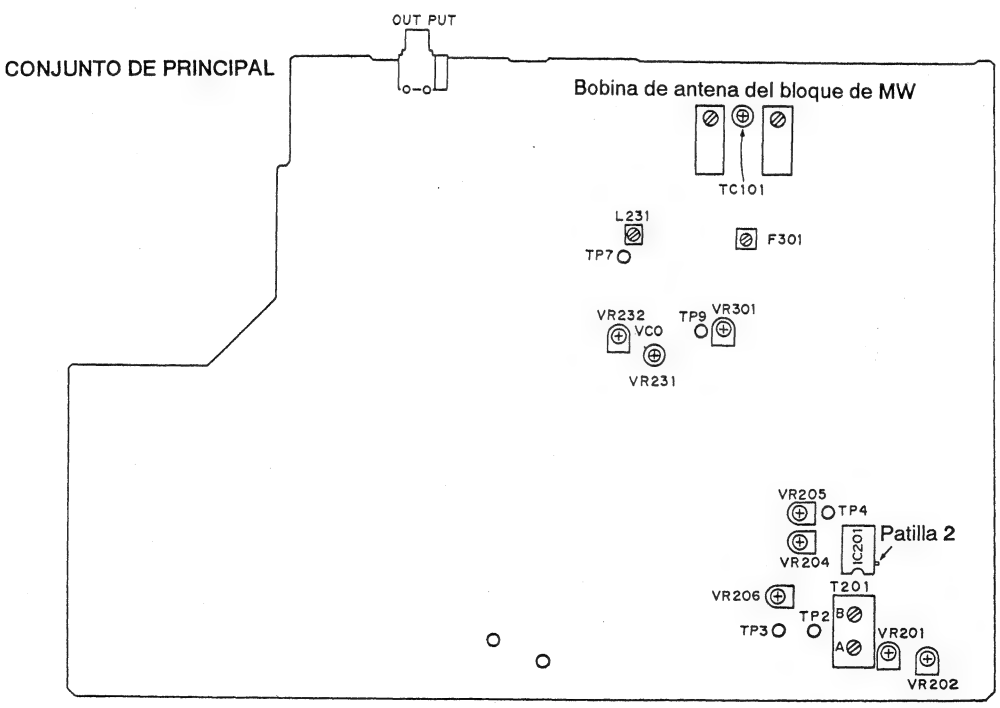


Fig. 6–3 Punto de ajuste

7. FOR F–449L/HE, HB AND F–449–S/HEWZ TYPES

CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

The F–449L/HE, HB and F–449–S/HEWZ types are the same as the F–449/HEWZ type with the exception of the following sections.

Mark	Symbol & Description	Part No.				Remarks
		F–449/ HEWZ type	F–449L/ HE type	F–449L/ HB type	F–449–S/ HEWZ type	
⊙	TUNER assembly	AWZ3643	AWZ3647	AWZ3647	AWZ3643	
⊙	POWER assembly	AWZ3649	AWZ3653	AWZ3653	AWZ3649	
⚠	AC Power cord	ADG1021	ADG1021	ADG1085	ADG1021	
	Station button	AAD1751	AAD1751	AAD1751	AAD1753	
	Station button	AAD1752	AAD1752	AAD1752	AAD1754	
	Panel base	AMB1842	AMB1842	AMB1842	AMB1843	
	Bonnet	AZN1745	AZN1745	AZN1745	.....	
	Bonnet case	.....	.....	.....	AZN1803	
	Screw	ABA1047	.....	.....	ABA1047	
	Screw	BBT30P060FZK	BBT30P060FZK	BBT30P060FZK	.....	
	Screw	.....	.....	.....	ABA–274	
	Packing case	AHD2056	AHD2057	AHD2057	AHD2058	
	FM antenna assembly	ADH1002	.....	.....	ADH1002	
	FM antenna	.....	ADH1005	ADH1005	.....	
	Operating instructions (German)	ARC1264	.....	.....	ARC1264	
	Operating instructions (English/French/Italian/Spanish/ Portuguese/Dutch/Swedish/German)	.....	ARE1191	.....	.....	
	Operating instructions (English)	.....	.....	ARB1314	.....	

⊙ TUNER ASSEMBLY (AWZ3647)

The TUNER assembly (AWZ3647) is the same as the TUNER assembly (AWZ3643) with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		AWZ3643	AWZ3647	
	L101	LAU2R2M	.....	
	L102–L104	LAU470K	.....	
	L232	LAU010M	.....	
	L233, L234	LAU100K	.....	
	D108	1SV156	.....	
	D101, D102	.....	1SS85	
	D103–D106	1SS252	.....	
	Q104–Q106	.....	XDC143ES	
	C101	CKDYX103M25	.....	
	C102	CKPUYY103M16	.....	
	C105	.....	CKDYF223Z50	
	C110, C112, C253	CKDYX103M25	.....	
	C116	.....	CKDYX103M25	
	R101	RD1/8PM153J	.....	
	R102	RD1/2PM751J	RD1/4PM472J	
	R103	RD1/8PM330J	.....	
	R106, R109, R308	.....	RD1/8PM681J	
	R107	.....	RD1/8PM104J	
	R108, R402	.....	RD1/8PM102J	
	R114, R115	.....	RD1/8PM103J	
	R247, R248	RD1/8PM103J	RD1/8PM102J	
	R177	RD1/8PM221J	RD1/8PM331J	
	Antenna terminal 2P	AKA1012	.....	
	Antenna terminal 4P	.....	AKA1010	
	Front End Module Assembly	AXQ1004	AXQ1003	
	AM RF Tuning Block	AXX1011	.....	
	AM RF Tuning Block	.....	AXX1012	
	AM RF Tuning Block	.....	AXX1013	

⊙ POWER ASSEMBLY (AWZ3653)

The POWER assembly (AWZ3653) is the same as the POWER assembly (AWZ3649) with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		AWZ3649	AWZ3653	
⚠	C353	ACG1002	.....	
⚠	L351	ATF-163	.....	

8. SPECIFICATIONS

8.1 TECHNISCHE DTEN (F–449/HEWZ)

UKW-Tunerteil

Frequenzbereich ..... 87,5 bis 108 MHz
Nutzempfindlichkeit
NORMAL ..... Mono: 12,1 dBf, IHF (1.1 µV/75 Ω)
50 dB Empfindlichkeitsschwelle
NORMAL ..... Mono: 16,2 dBf, IHF (1.8 µV/75 Ω)
Stereo: 36,2 dBf, IHF (17.7 µV/75 Ω)
Empfindlichkeit (DIN)
NORMAL ..... Mono: 0,9 µV/75 Ω
Stereo: 28 µV/75 Ω
Rauschabstand ..... Mono: 83 dB (bei 80 dBf)
Stereo: 78 dB (bei 80 dBf)
Verzerrung (bei 80 dBf)
NORMAL ..... Mono: 0,2% (1 kHz)
Stereo: 0,3% (1 kHz)
Ausweichkanal-Trennschärfe
NORMAL ..... 70 dB (400 kHz)
SUPER NARROW ..... 65 dB (300 kHz)
Stereotrennung ..... 50 dB (1 kHz)
40 dB (20 Hz bis 10 kHz)
Frequenzgang ..... ± 1 dB (20 Hz bis 15 kHz)
Spiegelselektion ..... 50 dB
ZF-Sicherheit ..... 90 dB
AM-Unterdrückung ..... 60 dB
Nebenwellenunterdrückung ..... 70 dB
Hilfsträgerunterdrückung ..... 55 dB
Ansprechschwelle für Geräuschsperre ..... 23,2 dBf (4 µV/75 Ω)
Antenneneingang ..... 75 Ω unsymmetrisch

MW-Tunerteil

Frequenzbereich ..... 531 kHz bis 1.602 kHz (Step 9 kHz)
Empfindlichkeit (IHF, Rahmenantenne) ..... 300 µV/m
Trennschärfe ..... 30 dB
Rauschabstand ..... 50 dB
Spiegelselektion ..... 40 dB
ZF-Sicherheit ..... 50 dB
Antenne ..... Rahmenantenne

Audioteil

Ausgang (Pegel/Impedanz)
UKW (100% Mod.) ..... 650 mV/0,9 kΩ
MW (30% Mod.) ..... 150 mV/0,9 kΩ

Sonstiges

Netzanschluß ..... Wechselstrom 220 – 230 V, 50/60 Hz
Leistungsaufnahme ..... 15 W
Abmessungen ..... 420 (B) x 86 (H) x 316 (T) mm
Gewicht (ohne Verpackung) ..... 3,4 kg

Mitgeliefertes Zubehör

T-förmige UKW-Antenne 1
MW-Rahmenantenne 1
Cinch-Anschlußkabel 1
Bedienungsanleitung 1
Steuerungskabel 1

HINWEIS:
Änderungen der technischen Daten und des Designs zum Zwecke der Verbesserung vorbehalten.

8.2 SPECIFICATIONS (F–449L/HE)

FM Tuner Section

Frequency range ..... 87.5 MHz to 108 MHz
Usable Sensitivity
NORMAL ..... Mono: 12.1 dBf, IHF (1.1 µV/75 Ω)
50 dB Quieting Sensitivity
NORMAL ..... Mono: 16.2 dBf, IHF (1.8 µV/75 Ω)
Stereo: 36.2 dBf, IHF (17.7 µV/75 Ω)
Sensitivity (DIN)
NORMAL ..... Mono: 0.9 µV/75 Ω
Stereo: 28 µV/75 Ω
Signal-to-Noise Ratio ..... Mono: 83 dB (at 80 dBf)
Stereo: 78 dB (at 80 dBf)
Signal-to-Noise Ratio (DIN) ..... Mono: 72 dB
Stereo: 65 dB
Distortion (at 80 dBf)
NORMAL ..... Mono: 0.2 % (1 kHz)
Stereo: 0.3 % (1 kHz)
Alternate Channel Selectivity
NORMAL ..... 70 dB (400 kHz)
SUPER NARROW ..... 65 dB (300 kHz)
Stereo Separation ..... 50 dB (1 kHz)
40 dB (20 Hz to 10 kHz)
Frequency Response ..... ± 1 dB (20 Hz to 15 kHz)
Image Response Ratio ..... 50 dB
IF Response Ratio ..... 90 dB
AM Suppression Ratio ..... 60 dB
Spurious Response Ratio ..... 70 dB
Subcarrier Product Ratio ..... 55 dB
Muting Threshold ..... 23.2 dBf (4 µV/75 Ω)
Antenna Input ..... 75 Ω unbalanced

AM (MW) Tuner Section

Frequency range ..... 531 kHz to 1,602 kHz (9 kHz step)
Sensitivity (IHF, Loop antenna) ..... 300 µV/m
Selectivity ..... 30 dB
Signal-to-Noise Ratio ..... 50 dB
Image Response Ratio ..... 40 dB
IF Response Ratio ..... 50 dB
Antenna ..... Loop Antenna

LW Tuner Section

Frequency range ..... 153 kHz to 281 kHz
Sensitivity (IHF, Loop antenna) ..... 1,000 µV/m
Antenna ..... Loop Antenna

Audio Section

Output (Level/Impedance)
FM (100 % MOD) ..... 650 mV/0.9 kΩ
AM (30 % MOD) ..... 150 mV/0.9 kΩ

Miscellaneous

Power requirements ..... a.c. 220 – 230 Volts~, 50/60 Hz
Power Consumption ..... 15 W
Dimensions ..... 420 (W) x 86 (H) x 316 (D) mm
Weight (without package) ..... 3.4 kg

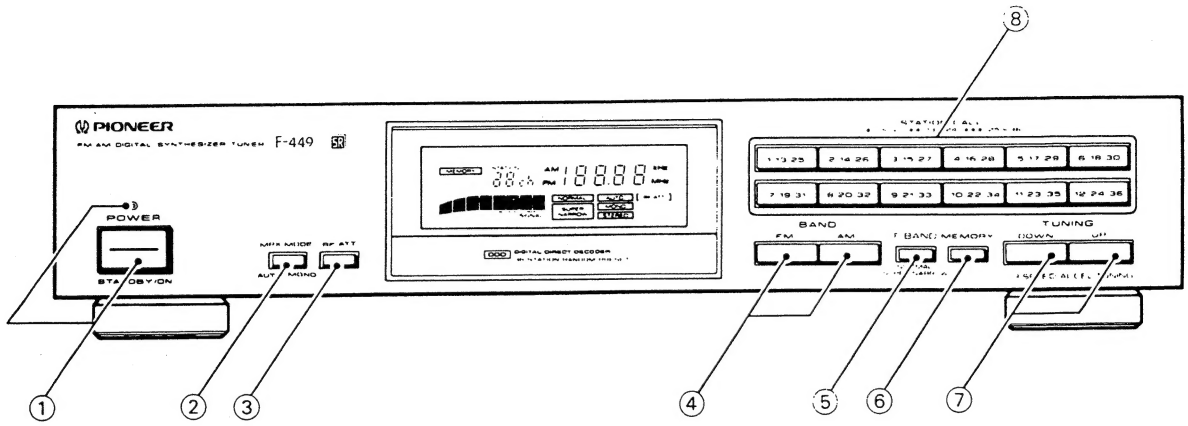
Furnished Parts

FM T-type Antenna 1
AM Loop Antenna 1
Connecting Cord with Pin Plugs 1
Operating Instructions 1
Control cord 1

NOTE:
Specifications and design subject to possible modification without notice due to improvements.

9. PANEL FACILITIES

9.1 BEDIENELEMENTE AUF DER VORDERSEITE (F–449/HEWZ)



① Netzschalter (POWER, STANDBY/ON) mit Anzeige

Bei eingeschaltetem Strom, leuchtet die Anzeige.

ON (ein)..... Wenn der Schalter auf die Position ON gestellt ist, wird Strom zugeführt und das Gerät ist betriebsbereit.

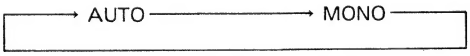
STANDBY (Bereitschaft) ... Wenn der Schalter auf die Position STANDBY gestellt ist, wird der Haupt-Stromzufluß abgeschaltet und das Gerät ist nicht länger vollständig bedienbar. Ein Stromzufluß von einer Minute reicht aus, um das Gerät wieder in Betriebsbereitschaft zu versetzen.

HINWEIS:

- *Die Festsender bleiben dauerhaft gespeichert, solange das Gerät an einer Steckdose angeschlossen ist.*
- *Nach dem Abtrennen des Netzkabels bleiben die Daten im Festsenderspeicher noch einige Tage lang erhalten.*

② Multiplex-Betriebsartenschalter (MPX MODE)

Beim Betätigen dieses Schalters wird nach folgendem Schema zur jeweils nächsten Betriebsart gewechselt:



Beim MW-Empfang ist dieser Schalter funktionslos.

AUTO:
Die Rundfunksendungen werden, abhängig vom eingestellten Sender, automatisch in Stereo oder Mono empfangen.
Die [AUTO] -Anzeige leuchtet.

HINWEIS:
Wenn der Signalpegel für ausreichend guten Empfang zu schwach ist, wird der Ton automatisch stummgeschaltet.

MONO:
Zum Empfang von Stereosendern in Mono.
Die [MONO] -Anzeige leuchtet.

HINWEIS:
Die Einstellung des Schalters wird beim Einspeichern eines Senders zusammen mit der Sendefrequenz gespeichert.

③ Schalter für HF-Dämpfung (RF ATT)

Das HF-Dämpfungsglied kann durch Drücken dieses Schalters aktiviert werden (Anzeige RF ATT leuchtet), um beim Empfang eines stark einfallenden Senders (Nahsender) Tonverzerrungen zu reduzieren. Das HF-Dämpfungsglied sollte normalerweise ausgeschaltet bleiben.

HINWEIS:
Dieser Tastenzustand ist für jeden Sender im Senderspeicher voreingestellt.

④ Wellenbereich-Wahltasten (BAND)

FM (UKW):
Für den Empfang von UKW-Sendungen.
AM (MW):
Für den Empfang von MW-Sendungen.

⑤ Bandbreitenschalter (IF BAND)

Bei jedem Tastendruck, schaltet die Bandbreite der IF-Schaltung zwischen "normal" und "super schmal" für den UKW-Wellenbereich.
Die gewählte Bandbreite wie folgt angezeigt:
Die [NORMAL] oder [SUPER NARROW] Anzeige leuchtet auf.
Wenn von anderen Sendern Störungen auftreten, stellen Sie diesen Schalter auf SUPER NARROW.

HINWEIS:
Die Einstellung des Schalters wird beim Einspeichern eines Senders zusammen mit der Sendefrequenz gespeichert.

⑥ Speichertaste (MEMORY)

Diese Taste ist zum Einspeichern eines Festsenders zu drücken.
Die Anzeige [MEMORY] leuchtet danach einige Sekunden lang, wobei der eingestellte Sender innerhalb dieses Zeitraums durch Betätigen einer der Festsendertasten (STATION CALL) gespeichert werden kann.
Siehe auf der Seite 8 für weitere Einzelheiten zur Bedienung.

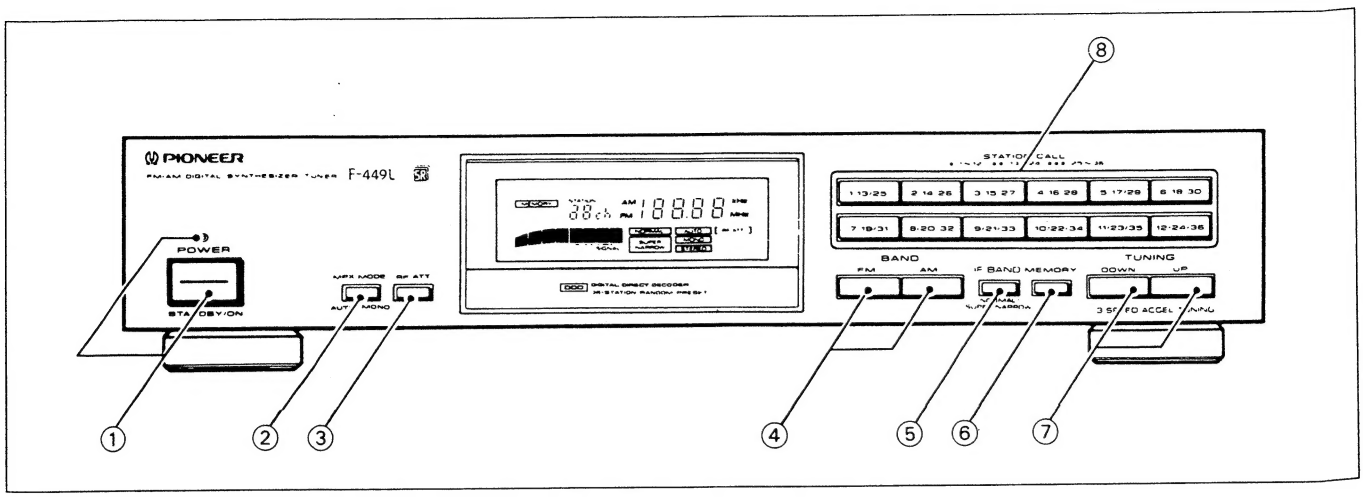
⑦ Abstimmtasten (TUNING UP/DOWN)

Diese Tasten dienen zum Abstimmen des Tuners auf die jeweilige Sendefre quenz. Zur Einstellung frequenzmäßig höherer Sender als der gegenwärtig abgestimmte, ist hierbei die UP -Taste zu drücken und für frequenzmäßig tiefere Sender die DOWN -Taste.

⑧ Festsendertasten (STATION CALL)

In den Speicherplätzen dieser Tasten können beliebige Sendefrequenzen für späteren Abruf auf Tastendruck vorgespeichert worden.

9.2 PANEL FACILITIES



① POWER (STANDBY/ON) switch/indicator

When the power is on, indicator lights.

ON ..... When set to ON position, power is supplied and the unit becomes operational

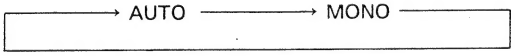
STANDBY .. When set to STANDBY position, the main power flow is cut and the unit is no longer fully operational. A minute flow of power feeds the unit to maintain operation readiness.

NOTE:

- *The memory will be backed up so long as the power cord is not unplugged.*
- *If the power cord is unplugged, the memory will be retained for several days.*

② MPX (multiplex) MODE button

Mode changes as follows each time this button is pressed:



This button does not affect AM reception.

AUTO:

Depending on the broadcast station, STEREO or MONO is automatically selected.

[AUTO] indicator lights up.

NOTE:

When the signal level is too weak for reception, sound output is automatically muted.

MONO:

To receive stereo broadcasts in monaural.

[MONO] indicator lights up.

NOTE:

This button's status is preset for each station in station memory.

③ RF ATT button

Set this switch to ON when receiving strong FM signals (nearby stations) to reduce sound distortion ([RF ATT] indicator lights).
Normally, this switch should be set to OFF.

NOTE:

This button's status is preset for each station in station memory.

④ BAND selector buttons

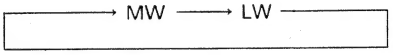
FM:

Press to receive FM broadcasts.

AM:

Press to receive AM broadcasts.

Each time you press this button, the band switches in the following way.



⑤ IF BAND button

Each time this button is pressed the bandwidth of the IF circuit switches between "normal" and "super narrow" for the FM band.
The selected bandwidth is displayed as follows:
The [NORMAL] or [SUPER NARROW] indicator lights up.
Set to SUPER NARROW in case of interference from other stations.

NOTE:

This button's status is preset for each station in station memory.

⑥ MEMORY button

Press to memorize preset stations. The [MEMORY] indicator will remain lit for several seconds. Press the desired STATION CALL buttons to memorize it during this period.
See page 10 for operational details.

⑦ TUNING UP/DOWN buttons

Use these buttons to tune in broadcasting stations. Press UP to receive a station whose frequency is higher than the displayed frequency, and DOWN to tune into a lower frequency station.

⑧ STATION CALL buttons

Use these buttons to preset stations and to receive already preset stations.